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[OFFICIAL NOTICE.]

Experience Section, Pacific Coast Gas Association.

OFFICE OF THE EXPERIENCE EDITOR,
ROOM 610, 445 SUTTER STREET,
SAN FRANCISCO, CAL., June 26, 1910.

To the Members of the Pacific Coast Gas Association: Someone has said that "Education is not the result of a course of study; it is the result of a course of experience." And the Editor of your Experience Department, whom you honored by that appointment at the last meeting, would like to have you share with him a bit of experience that has helped to make you successful, so that he can tell it to the Association at the Los Angeles meeting, which is so near at hand—September 20, 21 and 22. The name of the sender will be treated confidentially, if so desired.

Faithfully yours,
LEON B. JONES, Editor.

BRIEFLY TOLD.

SPECIAL EDITORIAL CORRESPONDENCE, MEETING OF EMPIRE STATE GAS AND ELECTRIC ASSOCIATION.—Here are two special renderings respecting the recent meeting of the Empire State Gas and Electric Association:

HUDSON NAVIGATION COMPANY,
STEAMER "ADIRONDACK," July 8, 1910.

Dear JOURNAL: About 50 members attended the meeting of the Empire State Gas and Electric Association, which was held in Schenectady to-day. The meeting was held in the cool and cosy club house of the Mohawk Gas Company, under the presidency of the alert and irrepressible Mr. R. M. Searle, of Rochester, who surely is a marvel. I regret to say that few gas men were present, which was not as it should have been; for they, least of all, should know that nothing is to be gained by hiding one's light under a bushel. Topics of interest to gas men that were discussed were upon gas water heaters and special rates for industrial gas. In the latter connection some very peculiar ideas were advanced. Mr. M. Webb Offutt, the active Manager of the Schenectady Gas and Electric Company, was here, there and everywhere, always alert and successful in his attentions to the visitors. After a very substantial luncheon in the homelike dining room of the Club, an interesting visit was paid to the huge establishment of the General Electric Company. It is truly a pity that this meeting was not better attended, and it is to be hoped that the gas men of New York will pay closer heed to an Association that can undoubtedly be made of value to their industry.—Yours, etc., S. K. C.

SECRETARY CHAPIN'S BUDGET.—The following succinct account of the sessions of the Empire State Gas and Electric Association is from the practiced pen of the Association's clever Secretary, Mr. Chas. H. B. Chapin:

THE EMPIRE STATE GAS AND ELECTRIC ASSOCIATION,
NEW YORK CITY, July 11, 1910.

To the Editors, AMERICAN GAS LIGHT JOURNAL: On Friday, July 8th, the third of the Association's sectional meetings for the present year was held in Schenectady. Through the courtesy of Mr. M. W. Offutt, General Manager of the Mohawk Gas Company, and the Schenectady Illuminating Company, and of some of the officers of the General Electric Company, the meeting was held at the Mohawk Golf Club. The session started at 10 o'clock and adjourned at 1. The delegates, about 60 in number, were then entertained at luncheon in the Golf Club, following which they visited the works of the General Electric Company and the gas plant of the Mohawk Gas Company. At the morning session Mr. C. D. Haskins, of the General Electric Company, presented a short paper on the use of electricity in gas works, which provoked some little discussion, as there seemed to be a slight difference of opinion in regard to the advantages and disadvantages. Among other things it was pointed out that extreme care should be used in the wiring in case electrical motors or electric lights were used in gas works. The question of 25 cycle lighting was next taken up, and Mr. E. W. Allen, of the General Electric Company, discussed the subject formally, after which numerous questions were asked him and the discussion became general.

In preparation for the meeting, the members had been asked to suggest subjects which could be taken up informally, but it was impossible to get through with more than a comparatively few of the questions suggested. Among these subjects were: "Proper Size of Gas Water Heater to Sell for Use with Kitchen Boilers," "Gas Heat-

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ing on a Large Scale," and "Rates for Industrial Gas." There were four matters in regard to the use of electric fans, and the discussion on this subject was quite general. It was pointed out that there were so many wrinkles in the use of electric fans that it would be advisable if somebody would prepare a pamphlet which could be distributed to the users of fans which would suggest to them not only the proper method of use for ventilation, but also many other ways in which the fans could be used during other seasons of the year. Among those present were:

Name of Company.	Representatives.
Buffalo General Electric	R. McMillan.
Corning Gas and Electric	W. H. Christie.
Chuctanunda Gas	W. H. Cooper.
Edison Electric Light and Power	T. H. Pettingill.
Fulton Light, Heat and Power	L. W. Emerick, W. E. Moon,
General Electric	E. W. Rice, J. R. Lovejoy, C. D. Haskins, S. P. Bates, T. Beran, W. L. R. Emmett, R. H Rice, H. P. Kernochan, H. C. Ward and E. W. Allen.
Ithaca Gas Light	T. W. Summers.
Ithaca Electric Light	Mr. Brewer.
Montgomery Electric Light and Power	A. B. Cairns, L. J. Hiessler.
Mohawk Gas	M. W. Offutt, B. B. Steers, V. von Starzenskie.
Nassau and Suffolk Lighting, Hempstead	S. K. Campbell.
New York and Richmond Gas	W. J. Welsh.
Peekskill Railway and Light	S. Wilder, H. D. Swain, C. Le Clair.
Poughkeepsie Light, Heat and Power	T. R. Beal.
Rochester Railway and Light	R. M. Searle, C. G. Durfee, E. H. Yawger, H. Russell, F. Hellen.
Schenectady Illuminating	E. H. Robbins, W. A. Wadsworth, A. J. Smith.
Syracuse Lighting	J C. DeLong, E. W. Poole, R. H. Knowlton, J. O. Taylor, B. H. Atwood.
Utica Gas and Electric	M. J. Brayton, A. T. Throop.
Watertown Light and Power	J. I. Mange.
Westchester Lighting	G. T. MacBeth, J. T. Cowling, F. J. Murman, W. L. Secord, C. Otter, H. W. Deved.
Empire State Gas and Electric Association	C. H. B. Chapin.

CURRENT MENTION.—

Mr. Henry Schuster has been appointed assistant to Manager Spring, in the office of the Clinton (Mass.) Gas Company, vice Mr. George Barnes.

The Utilities Commission, in a case recently brought before it by the authorities of Kansas City, Mo., ruled in accordance with the opinion of Mr. Clyde Taylor, Attorney for the Board, that the local gas company must supply the request of two would-be consumers of gas, provided the applicants agreed to pay the cost of putting down 200 feet of pipe from a dead ending main. It was declared to the Commission that the Company had refused to extend the main, because, under its rules applying to such cases, as to the length in question, it was necessary to have 5 applicants for a supply. The Commission further ruled, in another dispute, that the Company had the legal right to demand a disposit of $5 from a consumer prior to installing a meter on his premises, and retaining the $5 thereafter as a guarantee that the bills would be paid.

"V. R. S," writing from Fort Worth, Tex., under date of the 10th inst., incloses the following: "Declaring in his opinion that the gas minimum ordinance is unreasonable, but that passing upon the validity or constitutionality of an ordinance is without the jurisdiction of a police judge, Judge H. P. Lane, in Corporation Court, this city last week, found T. J. Heard, J. L. McCown and J. W. Chestnutt, clerks in the general office of the Fort Worth Gas Company, guilty of violating the gas minimum ordinance, and imposed a fine of $1 each. Attorney Walter B. Scott, for the clerks, immediately filed notice of appeal. Commissioner Walkey suggested to Judge Lane before the court was convened that the decision be held up to allow a possible settlement between the corporation council and the Gas Company's attorneys. He said that the City Commission was anxious to settle the minimum fight outside of court, and that he believed the Gas Company would submit to the 50-cent minimum if the cases did not go against them. Judge Lane did not change his decision, however, and read a written opinion in which he reviewed the testimony presented at the hearing in corporation court. He characterized a decision in favor of the defendants as 'an unwise and unsafe precedent,' and mentions the apparent remedy of appeal, habeas corpus or injunction. He admits the facts throughout. Mr. Scott told the Clerk of the Court that he would furnish appeal bonds for his clients or that he would institute habeas corpus proceedings to have the clerks released from the jurisdiction of the corporation court. When Commissioner Maddox, who has urged enforcement of the ordinance, heard of Judge Lane's decision, he declared that cases would be filed against violators of the ordinance every day in corporation court if necessary, despite the avowed intention of appeal by the Gas Company. Judge Lane's opinion in full is: "There seems to be no disagreement between the city attorney and counsel for the defense as to the law; both admit that any business concern is entitled to earn a reasonable amount upon the investment, and there seems to be no dispute of the fact that about 8 per cent. is a reasonable amount upon an investment in this State Neither is there any denial of the fact that for the 3 months and a few days that this Company has operated it has earned approximately 1 per cent. on its investment. Upon the admitted law and fact of this case by both counsel for the city and for the defendant in a court of record or jurisdiction or a court of last resort, it seems there would be nothing to do but to hold that the ordinance is unreasonable, but I think it is an unwise and unsafe precedent, at least it is very injudicious for the court of so limited powers and jurisdiction as this court, to pass upon the validity of ordinances as applied to any particular case, or the constitutionality of any law, and while I have been called upon to do so in several important instances in this court, I refused to do so and when I contemplate what such a course might lead to by assuming such authority, I do not feel justified in passing upon the validity, reasonableness or constitutionality of an ordinance, when as in this case, the remedy is so apparent by appeal, habeas corpus or injunction. There being no dispute as to the facts, I think it is clearly the duty of this court to find the defendants guilty and pass the matter up to the higher courts."

[No. IV.]

Review of the Twenty-fifth Annual Report, Massachusetts Board of Gas and Electric Light Commissioners.

[Prepared for the Journal, by Mr. H. Thurston Owens.]

Meter Testing.—The number of meters tested on complaint were less than for the previous year; in fact, they only numbered one-third of those tested in 1903. The numbers for the past 3 years are as follows:

	1907.	1908.	1909.
Meters tested on complaint	356[1]	438	415

The total number of meters tested shows a large increase over the previous year, and nearly double that for 1903, the totals for the past 3 years being as follows:

	1907.	1908	1909.
Total meters tested	59,475[1]	58,875	73,994

The fees received for meter testing range from 25 cents to $2.50 and. after deducting the expenses, including salaries, quite a sizable balance is left. The operating account for the past 3 years reads as follows:

	1907.[1]	1908.	1909.
Income	$15,138.90	$15,053.80	$18,885.36
Expenses	11,133.54	13,041.04	13,837.61
Balance	$4,005.36	$2,012.76	$5,047.74

Electric Meter Testing.—The law covering the testing of electric meters has been in force for 8½ years, and during that time only 301 meters have been tested.

Accidents.—The fatal and non-fatal accidents, from both gas and electricity, are given in detail as usual, and it is encouraging to note that the former are smaller than for the previous year.

The volume of oil gas sales has been steadily decreasing for the past three years, the figures reading as follows:

1907.	1908.	1909.
2,463,820 cu. ft.	2,371,110 cu. ft.	2,178,262 cu. ft.

The total quantity of acetylene gas sold is about half that of the oil gas sales, but it is distributed from 13 plants, as against 3 making oil gas.

Unaccounted-for.—The companies showing the greatest percentage of unaccounted-for in 1908 and 1909 were as follows:

	Percentages— 1908.	1909.
Stoneham	31.59	32.48
Worcester county	20.04	11.59
Greenfield	19.01	14.70
Chicopee	11.29	23.89
Norwood	15.93	17.05

In Boston the percentage has been reduced from 5.16 to 2.69.

Stockholders.—The usual figures as to the number of stockholders of both gas and electric properties show that they are very closely held; and further, by far the major portion is held by residents of the State. In fact, in the case of 22 gas and 24 electric companies all of the stockholders are residents of Massachusetts.

Coal Gas Statistics.

	1907. Cubic Feet.	1908. Cubic Feet.	1909. Cubic Feet.
Gas Made	7,829,587,670	8,541,428,669	9,010,581,767
" Bought	2,715,169,760	2,932,414,100	2,962,246,328
Total	10,544,757,430	11,476,842,769	12,052,828,095
Sold by Meter	9,176,325,265	9,990,925,065	10,536,447,801
" for Public Lamps	197,858,940	213,849,433	224,473,395
Used at Works and Offices	58,818,958	59,041,100	62,320,863
Unaccounted-for	632,848,986	648,384,456	549,439,649

The only item showing a decrease is that which would ordinarily show a gain, namely, gas unaccounted-for, which dropped from 6 per cent. in 1907 to 4½ per cent. in 1909.

1. For 11 months.

Lecture Delivered by Mr. R. C. Dawes at the Sixth Annual Meeting, Iowa District Gas Association.

An unfortunate remark, made in a moment of perhaps justifiable irritation, robbed Wm. H. Vanderbilt of a well-merited reputation for ability and liberality in the conduct of a great railroad, and has caused some to forget the large constructive work accomplished by his broad judgment and liberal investments for the betterment of the public service. With his money and his life he served the public, extending and improving the facilities offered by his roads at constantly decreasing rates. With his lips, in an unguarded moment, he damned the public. We shall forget his service before we forget his curse, but the fraternity has suffered for his indiscretion and profited by his example.

Public utilities must not only be right; they must appear to be right. They must have regard, not only for character but for reputation. When one discusses questions involving the intentions of the public, with respect to legislation affecting the interests we represent, it should certainly be in no resentful spirit, whatever those intentions may be, for in this country we are all glad to say the majority rules. The voice of the people controls; but let us remember that it is a deliberate voice. No hasty expression controls, No expression of mere feeling controls. No expression of resentment controls, unless calm, unbiased judgment declares that the feeling of resentment is justified in the clear light of truth.

This is a government of the people, by the people, and for the people; carefully constructed to prevent the people from hurting the people. The fundamental idea in the Constitution of the United States is this: "When you are angry count 10 before you speak." The constitutional limitations of power, the interposition of the legislatures, State and national, both with upper and lower chambers with varying tenures of office, the "checks and balances" between executive, legislative and judicial authorities, were all carefully designed to secure popular government, once removed as it were; that is, to establish a representative government, not a free democracy. The theory of the "founders" appears to have been that, upon every question appealing to the feelings, public opinion will always reverse itself. A careful scrutiny of the history of our political campaigns appears to support this theory. How often, upon the first statement of a public wrong, real or imagined, a flame of public resentment breaks forth, demanding immediate and summary corrective legislation; but after a fierce campaign and full discussion the truth is brought forth, the resentment dies, and the legislation that follows is neither immediate, summary nor responsive to the first forgotten demand. It is this certainty of calm consideration, the realization of this capacity of the American people to take "sober second thought" and to act only upon judgment, and the guarantees of the Constitution that we cannot act too impulsively, that gives usimplicit confidence in the public verdict and justify in this country the saying, "The voice of the people is the voice of God."

Upon any question affecting the interests we are employed to protect, we shall accept this final verdict. We are citizens before we are employees. We support the interests of the American people before we support the interests of our bondholders and our stockholders. Ourselves and our children have as much at stake in preserving the rights and interests of the common people as anyone has. Therefore, we ought to endeavor to present the truth and to express our views, not in hostility to any public opinion partly formed, but to be of service in the forming of it, for, as I have hinted, the present state of public opinion, however unanimous, is not the final verdict.

Let it be understood I do not presume to express your views. There is as much difference of opinion in this body as in any other. I shall express simply my own ideas with respect to the laws adopted and under consideration in various States, establishing commissions to regulate public utility corporations.

The public has an interest in the use of property employed in public service. No one claims that public utility companies can be conducted exactly as purely private enterprises are conducted. Where competition is limited by reason of privileges granted, some limit must be placed to the demands of such holders of monopoly. When public property is used, or the right is granted to condemn the property of another, some regulations must be exercised to guarantee that such property should be devoted to the use and not to the abuse of the public. These ideas are not new, but they have until recently been forgotten for several generations.

In the early days, under this government, there were no general incorporation acts. Prior to 1860 less than 250 corporations were formed, and these only by special legislation, under circumstances affecting in some manner the interest of the public at large, as for canals, highways, etc. This was not because stock companies were unknown, but because past experience in England had disclosed the dangers associated with them. The possible abuse of such privileges of incorporation was foreseen by the broad-minded statesmen of that day, though it is doubtful if they appreciated the immense efficiency of corporate activity in business. They made no provision for it except by special legislative enactment. As soon as this efficiency was recognized, and the titanic task of developing this great country was really begun, and ever since then, the formation of stock companies has been through the general laws of the various States. The privileges extended in the simple act of incorporation, though it has become a formal matter only, are of such a nature as to justify, and possibly will soon necessitate, careful supervision and regulation. So that this question of regulation will assume great controlling possibilities, not only in the operations of railroad companies and public utility companies, but eventually the activities of other corporations. This is a government function of vast proportions.

Shall we turn it over to expert commissions, or shall we, through the force of public opinion and by the existing machinery of law, attempt to correct the abuse that we have suffered, and do suffer?

This latter method is not popular in these days. The *laissez faire* doctrine is translated to-day as the "Let her go Gallagher;" but it was the accepted theory of the early statesmen. "That Government is best that governs least" was a popular doctrine, until the last few years. It is true that there is always more danger of too much than of too little government. To extend and enlarge the powers of the executive branch of government are especially dangerous matters. These are the words of Daniel Webster:

"The contest, for ages, has been to rescue liberty from the grasp of executive power. Whoever has engaged in her sacred cause, from the days of the downfall of those great aristocracies which had stood between the king and the people, to the time of our own independence, has struggled for the accomplishment of that single object. On the long list of the champions of human freedom there is not one name dimmed by the reproach of advocating the extension of executive authority."

The old adage, "Eternal vigilance is the price of liberty," being translated, means that the tendency towards the multiplication of government activities, which is constantly going on, is away from liberty and that liberty is like a reputation—hard to get and easy to lose.

De Tocqueville's early warning was that Americans might lose their liberty by coming to depend too much upon the government to do things for them, by permitting their individual energies to be absorbed into governmental activities, and gradually might part with their sovereign power by refusing to take the necessary pains to exercise it. It is true to-day that many who habitually neglect their political duties advocate, as the remedy for every abuse, the extension of some department of executive authority. This may be the easiest and the quickest remedy, but it is not, therefore, the best remedy. The machinery we now have is hard to start and moves slowly, but in trying to improve it we should be careful not to make it autocratic. To extend the authority of executive power tends undoubtedly towards autocracy. To call those who hold autocratic power by some new name does not change the relationship. Every name that has designated the holder of autocratic power, Tyrant, Despot, King, Emperor, Lord Protector, Czar, has successively, in the course of time, been brought into disrepute. The great problem of a free government is to distribute authority without destroying liberty. This necessitates a complicated form of government, sometimes cumbersome in operation and slow in its processes; but, if I may quote again from Daniel Webster:

"Liberty is only to be preserved by maintaining constitutional restrainings and just divisions of political power. Nothing is more deceptive or more dangerous than a pretense of a desire to simplify government. The simplest governments are despotisms."

An autocratic government is more efficient, perhaps; but that government is the most free in which the people do the most for themselves. In a recent address President Hadley said:

"The people under existing circumstances are brought face to face with a difficult alternative. If, in the desire to secure efficiency, they leave the business of government to experts, democracy dies of dry rot."

These are strong words, but certainly, under such conditions, we should gradually lose that all-compelling power of public opinion that prevails to-day. Moreover, we should be in danger, if such instrumentalities were multiplied, of realizing the truth of these words of Macaulay:

"We could make shift to live under a debauchee or a tyrant; but to be ruled by a busybody is more than human nature can bear."

I do not mean that these consequences are immediately threatened by this single step. I inquire if this one, in connection with others already taken and now proposed, do not lead in this direction? It is my opinion that they do.

This passion for directing and regulating, for this continuous benevolent supervision, so hateful to our fathers, will grow by indulgence. It directs itself now towards railroads and quasi-public companies; it looks next towards corporations of every class. It begins with expert engineers and accountants; it continues with expert secret service men. It begins by regulating; it continues by managing. It begins by making us secure against unfair attack, and relieving us from distress; it ends, as Macaulay expresses it, by becoming "a Lady Bountiful in every parish, a Paul Pry in every house-"

I am well aware that many of us who are engaged in the handling of public utilities companies favor State Commission laws. Many immediate advantages would accrue to many companies by the establishment of such laws, and it is not surprising that such proposals receive support from among the ranks of public utility men. It would free us from occasional unjust attacks by city councils and newspapers, affording a fair tribunal for immediate trial; it would put an end to holdup franchises and the fear of competition; it would educate the public to an appreciation of the elements of investment and cost of manufacture and delivery. It would make all franchises perpetual, and it would probably add to the stability of the stocks of the largest of these companies as permanent investments.

But the question of governmental policy involves weightier issues than those. The advantages to accrue to public utility companies could never justify the adoption of such laws. We certainly want no advantages if they are to be secured by jeopardizing the liberality of the people. It would never profit us to have our securities made stable by making our government unstable. But all of these laws that have as yet been passed, all that have been proposed, and all that will be passed under the present state of public opinion, have one defect. They forbid the issuance, under any circumstances, of stock, every share of which has not been fully paid for in cash. In the case of large companies, with developed business and a broad market for their stocks, this may inflict no injury. In the case of properties not developed, or of cities not yet supplied, the injury is apparent.

A railroad company, built and equipped, with a market price established on its bonds and stocks, has little, if any, further use for promotion stock; but without this device, how may a competing road be built? If the possible profit is limited to 6 per cent. on the money invested, the new road will be built only when the government guarantees this profit. But in the public mind watered stock is so intimately associated with deceit and misrepresentation of values that these laws have all provided for its entire abolition.

If it were the part of government to act as guardian and protector of the buyer of securities, then to prevent the stock of any company from being sold the first time at more than par, or at less than par, or to forbid the acceptance of any consideration for its sale the first time except cash, might be necessary, provided it be shown that to act otherwise would in itself be misrepresentation; but how could government protect the buyer against misrepresentation of values on subsequent exchanges of stock? Why should the abolition of a device, held to be fraudulent, be limited to any one class of corporations? Would a government sanction for any class of corporations a deceit it punishes in another class? Certainly not! If to issue and sell stock with face value greater than the cash paid in is to practice deceit and to take money on a false representation, no government can sanction it for any class corporations; but to assert that it is deceit and misrepresentation is to bring an awful indictment against the business organization of the modern world and to take a gloomy view of human nature. The greater part of our business is done by corporations, most of which corporations have issued stock in excess of cash paid in; all that have issued stock, with par value greater than the cash paid in, have had some object to accomplish by doing it, for it is obviously more simple and natural to make them the same. It is not the railroads, the public utilities, the giant industrials alone, that are handled in this way; it is your little factories, your laundries, your bakeries, your commercial houses, your mines, every form of business enterprise, large or small, that in its organization seeks to embody a certain and very common sort of agreement between men. This agreement is simply that one man, or class of men, shall, in consideration of furnishing the capital, be guaranteed (so far as the property purchased can guarantee it) against the loss of the capital furnished, or of the interest for its use, and that another man, or class of men, shall, in consideration of opportunity discovered, brains employed or time devoted, be permitted to share with the first class in the division of the profits earned by the use of this capital. This is a useful form of agreement. It cannot be embodied in a corporation except by issuing some stock with some consideration other than cash.

The trouble is that only the men who have money could get stock if all that is overissued must be paid for in cash; but the man who has the scheme is entitled to some share in what he earns, the man who has the brains and no money is entitled to a part of what his brains can earn. To forbid watered stock is to limit the advantages of incorporation to men who have money; it is to exclude from the privilege of incorporation those who have no money; it is the most aristocratic measure ever proposed to a free people.

Now, if it is true that agreements like the one I have described cannot be embodied in incorporate organization without issuing some stock that is not paid for in cash, the almost universal use of so called watered stock is readily understood, for this form of agreement pervades all business. It is the form of agreement that discovers the most efficient of our business men and satisfies their ambition, and, at the same time, meets the requirements of idle capital. It is as important to one class as to the other. Our undeveloped business demands it, and the capital would lie idle without it. It employs both, and in one form or another is the form of agreement necessary to develop the resources of a new country, or to introduce improvements in the machinery business into older countries.

The contributions to the success of any enterprise by those who take an interest in it must vary in kind as well as amount, and should be recognized in the organization of any company according to their respective values. This is usually accomplished by issuing bonds or prefered stock to the contributors of the capital, and by issuing the common stock, which acquires value only if the enterprise is successful, partly to those who have contributed cash, partly to those who have discovered the opportunity, or assume the management, or perform some service other than, or in addition to contributing to the capital.

Shall law intervene and say that contributions of brains and industry shall have no stock interest except by paying for it dollar for dollar? This would be a fraud against brains and industry. It would put the dollar above the man. Ever since corporations have been used, brains and industry and money have each had a due recognition, and the issues of stock have been such, from the beginning, that the par value of stock has had no ascertainable ratio to the actual cash cost of the property required, and corporations have been in use long enough to fix firmly in the mind that the latter, whatever it may be at first, is always changing. This understanding being firmly fixed, not only removed the element of deceit from the act of issuing stock of par value greater than the capital invested; it especially invites the attention of the buyer of stock to a consideration of the actual value acquired by its purchase.

To announce and enforce by law that the cash originally invested in property owned by a stock company must be equal in amount to the stock issued by that company, may be a guarantee as to the value of stock before that capital is invested; but, after such investment, the stock will become worth more or less, depending upon whether the enterprise succeeds or fails. Suppose it to fail, and many do fail, then the stock has no value. How could a prospective purchaser of this worthless stock be protected against his impulse to buy upon the assumption that, having been paid in full, it must, therefore, have value? There is a possibility here, also, of misrepresentation. There is in every transaction an opportunity to deceive. The doctrine of "caveat emptor" cannot be abrogated. The limitation of capitalization will never protect the public against its own unwillingness to investigate. Everybody who knows what a stock certificate is knows that it is not a measure of values. He knows it confers a proportionate ownership. To determine its value, he must know the total value of the property owned and opportunity controlled by the company, and the total stock issued by that company.

The other charge against watered stock is that unfair profits are

taken in order to pay dividends on it. It would surely be awful to contemplate the earnings required to pay dividends on all watered stock; but has anyone noticed that those companies without watered stock, comparatively speaking, are not trying just as earnestly to make money as companies with plenty of watered stock are? Every well-conducted company ought to use, and does use, every effort, within the limits of the civil and moral law, to make as much profit for its stockholders as it possibly can. There is a public interest in this, too, for if our business organizations lose efficiency, we shall not only lose our foreign markets but foreigners will invade our own.

When private corporations alone are considered, I confess myself unable to understand exactly the basis of the demand that they should never be allowed to issue any stock not fully paid. But it is one thing to say, as I do say, that the privileges cannot be abolished utterly without incalculable injury; and it is quite another thing to say, and I do not say that the practice of issuing watered stock has never been abused and ought not to be subject to any limitation. It has been abused, and it probably ought to be limited.

In the case of corporations being employed in the public service, such as railroad companies and public utility companies, the idea seems firmly fixed that charges for service are higher because of the dividend charges on watered stock. This is an assumption that has been proved; but, while maintaining it would be ruinous to abolish, I can realize there are some advantages to be gained by limiting the over-capitalization of these companies.

The interstate commerce commissioners and State railroad commission do not regard the issues of stock outstanding against railroads. They regard the cost of replacing the roads. The public utility commissioners, established, pay no attention to securities outstanding. They make expert examinations and valuations of the plants under their control, endeavoring to take into account all the elements of the cost of replacing the property used. They fix the charge for service on the basis. Contrary to the general expectations, this disregarding the interest charges on over-capitalization has resulted in no lowering of charge for service. Contrary to the general expectations, these commissioners have frequently authorized an increase in the charge for service and, generally speaking, have brought about, in States where they control, no reduction in selling prices beyond what the advance in the profession has brought about in other States. As a matter of fact, it is doubtful if one could easily name any other territory so populous, so conveniently situated as to supplies, as Massachusetts is, where the gas service is not supplied at lower rates and at a larger proportion of the people than in Massachusetts, where a commission has controlled for 24 years.

So it is not with any mistaken idea that it would lower selling prices that I say it may be necessary to put some limit to the capitalization of corporations engaged in public service. The prices of the commodities offered by such companies are almost universally unjust to regulation, either by commissions or by city councils. The idea I have in mind is that the public, having secured, either through the city council or through the commissioners, a fair adjustment of charges for service, has still another important object to gain; that is, to have a satisfactory service maintained continuously at high efficiency and extended as occasion requires. This calls for constantly increasing investments of cash, which can only be secured upon the credit afforded to the company by its property and earning capacity. Now, if a company controlling such a property should issue too many bonds and become unable to pay its interest and take care of its extensions, its property would suffer and its service would deteriorate. Receiverships would ensue and extensions would cease.

The Union Traction Company, of Chicago, might be cited as an illustration of the bad effects upon public service of an over-issue of bonds. Either as the direct result of this over-issue, or on account of a mismanagement, or both, the public suffered, not from high cost of service, for it has always been low, but from deterioration of the service offered and the cessation of extensions.

But let those who despise the much abused exising order of things study well this situation and they will see that, from that chaos of confusion, it is the city of Chicago, alone, that emerges gainer. Public opinion in that controversy first favored, then discarded, municipal ownership; and, finally, acting along traditional lines, and without the help of any commission, by the adjustment of franchise agreements, secured a settlement more favorable than ever could have been secured under any commission laws that have as yet been adopted. This settlement not only covered the prices to be charged for service, the consideration to be given to the city, the amount of securities that might be issued against the property, but contained also provisions requiring certain amounts to be set aside for depreciation and maintenance of the property.

These negotiations, and others, have disclosed that the powers reserved by the public under existing conditions are greater than had been supposed. The courts have held that the councils can fix rates, and that they must be reasonable. The present system subjects the company to local control and keeps it more strictly responsive to local public opinion. The power to negotiate franchise renewals rests in the city council, and there is no philosophy to support the theory that commissioners appointed by the governor will always be more honorable than councilmen elected by the people.

There are some who favor abandoning present methods of control and adopting the commission method, who do not believe there is in such a step any tendency towards a centralized and autocratic and away from a popular government. Others who favor such a step do so because they believe there is such a tendency. For my part, I believe in a popular government. I put a high value upon all of the institutions that were established by the founders of our government. I desire more than anything to preserve for this, and for future generations, the blessings of liberty gained at such an inestimable cost in the blood and sacrifice of many generations that have preceded us, and I believe that our government, as it was established, is the best government ever designed by man for the perpetuation of liberty. I should be opposed to any innovations that I believe not to be in harmony with its fundamental organizations.

It is natural, at a time when public feeling is aroused by abuses inflicted by corporations engaged in the public services, to jump to the conclusion that new methods must be sought to correct these abuses; but before we invoke new legislation and call into exercise new governing bodies, it would be prudent to take careful stock of the resources of the government under existing conditions, in order to be certain that we do not relinquish more than we gain by any hasty changes.

Gas Calorimetry.

[A lecture prepared for the Sixth Annual Meeting of the Iowa District Gas Association, by Mr. J. B. KLUMPP, Philadelphia, Pa.]

According to the plan issued by your Association, I have been asked to talk on the "A B C of Gas Calorimetry." I suppose that this means to introduce the subject from the beginning of the alphabet, although in speaking of gas calorimetry we generally work further down in the alphabet and refer to the B.T.U.'s. However, a few words on the elementary work might be of value to some who have not had very much experience in the methods of determining the heating value of gas.

The reason that gas calorimetry has attracted so much attention of late has undoubtedly been the extensive use during the past few years of gas as a fuel, either for the purpose of cooking or heating, or for the purpose of maintaining a gas mantle incandescent for illuminating purposes. The value of the gas thus used is undoubtedly proportional to its heating value, even with the incandescent mantle. The efficiency of the mantle at times is determined by the flame temperature, but even in this case the amount of the gas used is approximately inversely proportional to the amount of light given, the flame temperature depending more upon the rapidity of combustion, which is determined more particularly by the pressure and design of the burning appliance.

The New York State Commission Report, Second District, has shown by questioning the various companies, that approximately 80 per cent. of all the gas is used for its heating value, and, owing to this condition, they are contemplating an investigation to see whether it would not be justifiable to establish regulations that would judge the value of the gas by its heating value instead of its illuminating value; and, as you are all familiar with the Wisconsin Railroad Commission's action, by establishing a heating value of 600 heat units throughout the State instead of illuminating value, you will appreciate the importance of this subject and the step which it is likely to take before many years.

In the general manufacture of gas throughout the United States the standards for quality, as expressed by illuminating value, have been generally higher than either in England or on the Continent. This probably is due, in a great measure, to the large quantities of carburetted water gas made in this country compared with the quantities made abroad—in the United States, probably 65 per cent., not over 10 to 12 per cent. in England, and less on the Continent.

In forcing these regulations in this country, coal gas companies in many cities have been compelled to enrich their coal gas to obtain candle power, which has likewise raised the heating value. Such a

condition should not exist, as it is not an economic condition for all concerned to enrich a straight coal gas.

Dr. Bunte, in his address before the German Association of Gas and Water Engineers, Frankford-on-the-Main, June, 1909, stated that candle power was superfluous in the present art of gas consumption. He also stated that any particular heating value was not required; that a moderately low heating value was as good as a high heating value, provided the variation was limited. Of course, the lower the heating value necessarily the more gas will be consumed to do the same work, but the heating value should be such as could be generated most economically. With the best grades of coal there is probably no difficulty in obtaining 600 heat units, but, owing to the limited supply of such coals, and the necessity of obtaining coals from various fields, it is a question whether a 600-heat unit average is not too high a figure to adopt generally throughout the United States.

Benzol enrichment to obtain a higher candle power is an unsatisfactory method increasing the quality of gas, when its heating value is considered. In fact, it is more apt to cause an irregular heating value than any other method of enrichment. Dr. Bunte states that, under low and medium pressures, the rich gases do not give proportional candle power in the incandescent burner; that the poorer gases give better results, as the richer gases do not entrain enough air for perfect combustion until higher pressures are maintained. So that it will be seen, for more uniform work, it will probably be necessary to raise the pressures where the richer or higher heating value gases are concerned.

So it seems that, before any fixed ruling should be made regulating the quality of the gas supplied permanently, a thorough investigation should be entered into, covering the conditions of manufacture and supply in the neighborhood where such ruling is to exist. While these regulations in the past have nominally covered illuminating value, it would seem that evidently the heating value was undoubtedly considered by calling for different illuminating values for different qualities of gas. For instance, the old New York State regulations call for a 16-candle power coal gas, 20-candle power water gas, and 18-candle power mixed gas. Investigating the cause of such action, it was found that the testimony taken at the time indicated that these were fair requirements, as the heating value of the gases were approximately the same. From the readings made the last 2 years by the State Inspector, it will be seen that, if they had stated 15-candle power coal gas, 21-candle power water gas, and 18-candle power mixed gas, they would have nearer a uniform heating value.

The method of reading the illuminating value, of course, means a variation in the quality of the gas. The type of burner used might mean a difference of 1, 2 or 3 candles in the same gas, whereas the heating value read in a proper manner could only give one indication.

The reports of the American Gas Institute Calorimetry Committee have been before you for 2 years, and I presume you are all partially familiar with the work done and the methods adopted by this Committee, so I will not go into too much detail in some of the descriptions, as I trust that the slides that will be shown later will cover a description of the calorimeters quite specifically.

The heating value of the gas is expressed in British Thermal Units, or B. T. U., 1 B. T. U. being the quantity of heat that will raise 1 pound of water 1° F. at its maximum density. But the difference in value of a thermal unit under the ordinary ranges of water temperature, occurring during the readings of the calorimeter, do not affect appreciably the value of the B. T. U. indicated.

In our work in this country we measure the gas in cubic feet and commercial temperatures in degrees F., so that we have adopted the use of English units entirely in our work of calorimetry, which saves much labor in the calculations. Therefore we recommend that all our calorimeters measure the gas in cubic feet, indicate the water passed through the instrument in pounds and read our temperatures all in Fahrenheit degrees.

Assuming such an operation, it is natural we should select a calorimeter of the water heater type, and so far in our American practice the only instruments tested have been of this design, and we have found such a type to be eminently satisfactory for our gas works practice.

The calorimeters adopted are so constructed that the gas burner is in the interior of the calorimeter and burns at a fixed and measured rate. The heat thus evolved by the flame is transmitted direct to a certain quantity of water passing through the calorimeter. The temperature of this water is taken on entering and on leaving the instrument and the quantity of water passed is then caught and weighed. The weight of the water, times the temperature to which it is raised, fixes the quantity of heat absorbed by it. The quantity of the gas is known, therefore it is very easy to calculate the heating value of the gas. There are certain precautions, however, that must be taken to obtain comparatively systematic results. The amount of air that is admitted with the gas should not exceed, to a very great extent, the amount required for perfect combustion, the excess being limited to between 15 per cent. and 30 per cent., although these figures have not been absolutely determined and depend a good deal upon the method of operation and the design of the instrument. However, the temperatures of the products of combustion and excess air leaving the calorimeter should approximate the temperature of the gas and air entering the calorimeter. These conditions will exclude any great error occurring due to raising the temperature of excess air or excess humidity in the air. The calorimeter is so designed that these conditions will be reached if the inlet water to the calorimeter is approximately at the temperature of the air. This is so because the outgoing gases are jacketed first by the ingoing water.

Amongst the most important accessories for a good calorimeter are very fine thermometers, especially those that are used in determining the temperature of the water. These thermometers should be standardized throughout their range, and should be selected in pairs so that their errors will coincide as closely as possible.

Thermometers, such as recommended by the American Gas Institute Committee, are suggested for use and the greatest care should be taken in the use of these thermometers. The gas should be measured in a wet meter having a tenth of a cubic foot per drum revolution, and it is found advisable to make two revolutions of the drum which will give sufficient time in burning at a 5-foot rate to allow a sufficient number of readings of the water temperature to give a good average result. The gas should be corrected to 60 F. and 30 inches barometric pressure. The water should be gathered in copper pails or some other suitable vessels and weighed on a balance that will give readings to within .001 of a pound. It is advisable to have a small governor between the meter and the burner, so that the rate of combustion will be absolutely uniform.

If the pressure to the gas meter is high or irregular, it is recommended that a service governor be installed to govern the pressure to the meter, so that it will not be over 20-tenths.

In order to obtain the best results from the use of the gas calorimeter in a gas works or office, it is recommended that the calorimeter be installed in a permanent cabinet, that will enable it to be set up for once in a satisfactory manner and never be disturbed, unless it is necessary to dismantle it to be repaired or cleaned. Such installations have been made in several works, and the reports are that they are entirely satisfactory and enable readings to be made accurately and quickly. The design of such a calorimeter is shown on one of the slides, further details of the construction of which can be obtained from me by anyone so far interested.

One point about calorimeter operation that I would like to call your attention to is the water supply. We have been troubled in the past by an accumulation of mud and dirt on the interior tubes of the calorimeter, and I should think that this would be particularly so in this local district, where the city water supply comes from the Missouri river, and very often carries considerable entrained matter. If the ordinary filter will remove this mud or dirt, it should be installed in the water line to the overhead tank. If it is impossible to take it out, I would recommend that the overhead tank be filled with distilled water, and that after passing through the calorimeter it be collected in another tank under the calorimeter, and when the day's readings are over to have it pumped again in the overhead tank. Such an installation has been made and has been found to work satisfactorily.

Where the water supply is good, and the overhead tank does not hold enough water to make the desired number of tests, and the supply is at a temperature very much lower than the atmosphere of the room, it has been found satisfactory to install a small coil water heater and raise the temperature of the water flowing to the overhead tank to that of the room; the water flowing in the overhead tank will mix and have a fairly uniform temperature direct to the calorimeter.

There is a point that I wish to bring out—the use of the mixed units of measurement and reading adopted has complicated the calculations necessary in working up the heating value of the gas. These, however, have been greatly simplified by the adoption of American or English units, and to further facilitate in this work there has been

designed a heating value computer that is very similar to the candle power computer, which in a few moments will give the heating value of the gas very accurately from the observations made in reading the instrument. A cut of this computer is shown on one of the slides.

I am appending to this article directions for operating a calorimeter such as were written and adopted by a sub-committee composed of the State Engineers and the Gas Companies of New York State, Second District, which were written and intended for the companies of the State to conduct certain experiments in determining the heating value of the gas manufactured by these companies. These directions are concise and need not be read at this time. However, there were some general observations at the end that might be of interest to you, and which are as follows:

Precautions—"Don'ts."

Don't place lighted burner in calorimeter when water is not running through the calorimeter.

Don't shut off water while gas is burning; but if water is accidentally shut off, then shut off the gas quickly to avoid breaking thermometers.

Don't move suddenly near instrument during test. Slight draught thus caused will vary outlet readings and vitiate test.

Don't fail to check daily the water level in the gas meter.

Don't forget to test meter and all connections daily for leakages.

Don't erect the calorimeter too close to any heating or lighting appliance, where radiant heat might affect the readings.

Don't make the test with the inlet water temperature over 5° above or below the temperature of the room.

Don't fail to fill the overhead tank with water when through testing, so that it will be ready for the next test.

Note—

That an error of 1/10° F. in water temperature means an error of about 4 B.T.U.'s in the gas.

That an error of 1/100 of a pound of water, when burning .2 of a cubic foot of gas in the test, means an error of about .9 B.T.U. in the gas.

That an error of 1° in temperature of the gas means an error of about 1.8 B.T.U.'s.

That an error of 1/10 of an inch in barometer reading means an error of about 2 B.T.U.'s.

That when metering the gas, each additional inch of water pressure to which the gas is subjected means an error of about 1.5 B.T.U.

In the general work of gas calorimetry throughout this country, the American Gas Institute and the other engineering societies have generally accepted the heating value of gas to mean the total heating value evolved in burning the gas and reducing the products of combustion to the temperature of the surrounding atmosphere. This means that the total latent heat of the water vapors formed is considered as a part of the heating value of the gas, which means that the gross heating value only is considered and the net heating value discarded. The reasons for this are manifold and have been discussed by the American Gas Institute Committee in their reports for 1900, 1908 and 1909.

The direct reading of the calorimeter gives the gross heating value and it is difficult to obtain consistently the amount of latent heat of the water vapors formed to deduct from the gross for any other value, as this varies very considerably, due to the different conditions of the atmosphere.

Directions for Operating a Calorimeter.

1. On unpacking the calorimeter, see that it is cleaned inside and out and free of packing material.

2. Study carefully the erecting directions and cuts and see that all parts are included.

3. Handle the thermometers with the *greatest of care.*

4. The calorimeter should be set up in a quiet, light and well ventilated room or cabinet, which is free from draughts, and in which the temperature can be maintained constant at not less than 60° F. The room should be provided with a sink, and with a good supply of running water. It is advisable to have a large, shallow, overhead, covered tank, from which the water supply can be taken. Should the tank capacity be small and not hold enough water for a prolonged series of readings, a small gas water heater may be employed, as already noted, to bring the water to approximately the room temperature. It is desirable to use water in the calorimeter that is clear and free from suspended matter. Therefore, a filter should be installed in the water supply line before it enters the overhead tank.

5. If only a single test is desired, gas may be taken from the house piping, but if an average value is required, a small gasholder or averaging tank should be used, and the gas flowing into the holder adjusted to a rate of flow to just fill it in the time during which the sample is to be taken. Care should be taken to have a short service to this holder, in order that an average sample of gas may be obtained, and if the sample be taken from a line on which there is no considerable consumption, see that this line is thoroughly purged before sampling. It is recommended that the gas be metered at a pressure not to exceed 2 inches water; if this is not obtainable, it is advisable to insert a holder or diaphragm governor in the supply line to reduce the gas to within this pressure.

6. Set up the calorimeter so that the overflow and outlet water can be easily led to the sink. Make water connections with rubber tubing, being careful not to cramp the tubing. To avoid air currents caused by the movement of the observer's body, set up the calorimeter so that the water supply and waste may be easily adjusted, and that all temperatures may be readily observed. Lead the outlet water to a waste funnel, supported a little above the top of the copper or glass container used in collecting the water, so that the water can be shifted from the funnel to the container and back without spilling.

7. Set up the gas meter facing the observer and level it carefully; then, adjust the water level of the meter, both inlet and outlet being open to the air. To do this, remove the plug from the drywell, open the funnel cock and disconnect the tubing on the outlet of the meter. With one finger over the drywell, turn on the gas a little, and, by removing and replacing the finger, see that there is no water in the drywell. If water can be found therein it must be blown out by gas pressure. Notice whether the water in the gauge gas moves freely, as, if it does not, the meter is out of order. Now remove the finger from the drywell and add or remove water (through the funnel or by the cock under the gauge glass) until the lowest edge of the meniscus just touches the scratch on the gauge glass, or is even with the fixed pointer. Replace the plug in the drywell, close the funnel valve and connect the governor. If the meter has been filled with fresh water, the gas must be allowed to burn at least 2 hours before making a test. When the water in the meter is saturated with gas, 20 minutes should be sufficient.

8. Fill pressure regulator with water, then connect it to the calorimeter burner—metallic tubing is preferable; but when rubber tubing is used to connect meter, pressure regulator and burner connections should be as short as possible and should be saturated with gas.

9. Turn on gas, allowing it to burn for 5 or 10 minutes with the burner on the table. Shut off gas at burner and watch hand on meter for leakage. Be sure that all leaks are stopped before attempting to make a test. Start water running through the calorimeter at a rate of about 3 pounds per minute; then regulate the gas to flow at the rate of 4 to 7 feet an hour, as may be found by experiment to give the highest results with the gas to be tested, admitting enough air through the burner so that the flame shows a faint luminous tip, then insert the burner at the proper height in the calorimeter and observe again the condition of the flame to see that it is all right, using a mirror.

10. The excess of air passing through the calorimeter is controlled somewhat by the position of the damper in the exhaust port, and the best results are obtained by having the excess air as low as possible, still maintaining complete combustion of the gas. Such position has heretofore been found to be about ¼ open with these calorimeters already investigated. Care must be exercised to determine this for each calorimeter.

11. Water should be regulated so that there is a difference between the inlet and outlet temperatures of about 15° F. The temperature of the inlet water should vary but little when an overhead tank is used, and the water maintained at room temperature. Be sure that both overflows are running.

12. Before making the test, the barometer, temperature of the gas at the meter, temperature of the room and temperature of exhaust products, should be recorded. It is desirable to have the temperature of the inlet water and temperature of exhaust products as nearly as possible at room temperature, in order to establish more nearly a thermal balance; the difference in these temperatures should never exceed 5°.

13. Next allow the gas to burn on the calorimeter until a thermal balance is established, or until there is the least change in the inlet and outlet waters.

14. The test may now be started by shifting the outlet water from

the funnel to the container just as the large hand on the meter passes the zero point. Readings are then made of the inlet and outlet thermometer; making the readings as rapidly as the observer is able to record them during the consumption, preferably at $\frac{5}{10}$ of a cubic foot of gas. At least 10 readings should be made of both inlet and outlet water temperature. Water is again shifted from the container to the waste funnel as the hand passes the zero point the second time. Water is then weighed or measured. The uncorrected heating value per foot is obtained by multiplying the differences of the average of inlet and outlet temperatures by the number of pounds of water and dividing by 2-tenths. This quantity is divided by the correction factor for barometer and temperature, obtainable from tables, to give the heating values at 30-inch pressure and 60° F. The weight or contents of container should be obtained while the inside is wet. This may be done by filling it with water, emptying and shaking for about 5 seconds in an inverted position. This will do away with any correction where several consecutive tests are required with the same container.

15. A second, and perhaps a third, test is advisable, and these should be made without disturbing the existing conditions, provided all readings are within the above prescribed limits. In practice the operator should get consecutive results on the same holder of gas within 10 B.T.U. Under such conditions an average of the results may be taken.

Results as Obtained by Calculation.

16. The method of calculating the calorific value of the gas from the observations indicated is very simple, when all readings are made in English units, as recommended, and entered in some form conveniently arranged. A simple record sheet is illustrated in the American Gas Institute "Proceedings," Vol. 3, page 320, 1908.

17. The averages of the inlet and outlet water temperatures are made and any correction for thermometer error allowed for. The difference in these averages should give rise in temperature of the water. This rise in temperature of the water is then multiplied by the number of pounds of water passed through the calorimeter during the test. The product of these two is then divided by the quantity of gas burned, either .1 or .2 of a cubic foot, as may be. This quotient will give the heating value of 1 cubic foot of gas in B.T.U.'s at the indicated temperature and barometric pressure. To correct this to 60° F. and 30 inches pressure, divide by the "correction factor" for the indicated temperature and pressure as obtained from some standard table, a copy of which may be found opposite page 373, "Proceedings," American Gas Institute; Vol. 3, 1908. The final result will be the corrected heating value of the gas tested in B.T.U.'s.

18. Expressing the above in a formula we have:

$$\text{B.T.U. per cubic foot} = \frac{W \times T}{G}$$

W = weight in pounds of water passed.
T = the average difference in temperature in degs. F., between inlet and outlet water.
G = corrected volume of gas burned in cubic feet.

Use of Computer.

19. The labor for making the calculations for determining the heating value from observations of a calorimeter may be lessened by the use of a heating value computer. The computer consists of a circular slide-rule, with divisions corresponding to the readings made on the calorimeter. This computer gives the corrected heating value of a cubic foot of gas in B.T.U.'s, having the barometer and temperature of the metered gas, and the difference in temperature between the inlet and outlet water and the pounds of water passed. This computer is designed to operate within the limits of from 300 to 800 B.T.U.'s. Should a gas of a lower or higher heating value be measured, the computer can still be used by dividing or multiplying one of the other factors in its computation. A cut of this computer may be found on page 373, Vol. 3; "Proceedings," American Gas Institute.

Care of Instruments.

20. The calorimeter, being a delicate and sensitive instrument, should be very carefully cared for when not in use. If the instrument is set up permanently, provision should be made that it be not disturbed by anybody except the operator. If the instrument is not erected permanently, when dismantled it should be carefully cleaned inside and out and the thermometers removed and carefully packed in cotton.

21. It seems hardly necessary that instruction should be given for the care of such an instrument, but certain precautions should be noted.

Slide No. 1.—This shows a sectional view of the Junkers' calorimeter, as originally designed in 1894, and over which very little improvement has been made, except to place the thermometers on the same level. This shows the water entering in the bottom and leaving at the top, opposing the flow of gas its entire passage. The gas burning in the central opening passes from the upper part of the combustion chamber down through the tubes and discharges at the bottom of the calorimeter. The position of the gas burner is fixed by a clamping set-screw. The upper construction of the calorimeter is such that the water is baffled before reaching the outlet thermometer, so that no radiant heat from above the flame can reach this thermometer. The temperature from the discharged flue gases is taken, and these gases leave at a point in the calorimeter which is jacketed by the incoming water, and must necessarily leave the calorimeter at a temperature approximating that of the inlet water, provided this flow of water is adjusted so as to be in such quantity as will produce these results. The inlet water is controlled by a micrometer cock, and is operated at a constant head over a superimposed fixed weir. The outlet water is also discharged over a fixed weir, which means that a constant head is maintained through the instrument. I bring these points out, as various designers of calorimeters, brought out even some time after the Junkers was designed, overlooked many of these important characteristics. The Junkers calorimeter was also originally designed with a polished metal exterior jacket, covering an insulating air space, and this design has apparently given the best non-radiating efficiencies.

Slide No. 2.—The second calorimeter to appear in any quantities in this country was the Sargent, shown, as first designed, in this slide. This calorimeter was apparently copied from the Simmance-Abady. It had wooden lagging, thermometers on the same level, but did not have a fixed head of water through the calorimeter. This head was maintained by means of a pressure gauge, which was difficult to control. The gas went through the calorimeter tubes in one direction, but the water was carried several times back-and-forth, which gave irregular and uneven heating. This instrument brought out the first automatic dumping bucket, which automatically changed the flow of water to and from the measuring bucket. Their calorimeter was afterward improved, as shown in slide No. 3.

Slide No. 3.—Here it will be seen that the water flow is in one direction, and is controlled at an even head by a superimposed weir. The thermometers are on the same level, but the water is conveyed down the outside and up through the inside. The design of the Sargent calorimeter was somewhat modified and improved, as shown in slide No. 4.

Slide No. 4.—This slide gives the details rather explicitly. It will be seen that the thermometers are still on the same level, but the water goes in the bottom of the calorimeter and out the top, as in the Junkers. The micrometer cock for the water is above, by the inlet thermometer. The automatic water-dumping arrangement is still maintained, and a rather better type of damper controlling the flue products was added. This damper is graduated, so that the opening may be determined and maintained constant.

Slide No. 5.—Slide No. 5 shows this calorimeter erected and in place for operating. It will be seen that the Sargent Steam Meter Company were the first ones to adopt the principle of weighing the water, which was recommended by the American Gas Institute Committee. The Junkers appliances still provide for measuring the water volumetrically in large graduates. From this arrangement it will be seen that the automatic water dumping funnel is controlled by an electric magnet, operated from contacts made by the large end on the meter, as it passes the zero mark.

Slide No. 6.—Slide No. 6 shows a calorimeter new being built by the American Meter Company, that is practically a duplicate of the Junkers calorimeter, except that it has its thermometers on the same level. The makers of this calorimeter have adopted, as have the Sargent people, the same type of governor as is provided with the Junkers. It is a small wet-float governor, and gives excellent regulation. They have also adopted the method of weighing the water in copper pails, instead of measuring it volumetrically.

Slide No. 7.—Slide No. 7 shows another view of the same instrument.

Slide No. 8.—This shows a cross section of the Boys calorimeter, which is the calorimeter adopted by the London Gas Referees for the measurement of London city gas. It is constructed on an entirely different form from any of those previously shown and has a limited range of capacity. The gas, it will be seen, burns in two small Bray tips, in a luminous flame, in a combustion chamber in the center of

the calorimeter. The products of combustion pass from the top of the combustion chamber, down over a coil of water pipe, covered with thin radiating plates. It then passes under a partition, up and over a continuance of this coil and out through holes in a wooden cover. The air for combustion enters all around the lower edge of the calorimeter. It is impossible to control the supply of excess air, except by placing corks in the holes, discharging the products of combustion through the top. The radiant heat from the combustion chamber does not affect the outlet thermometer, as the water is exceedingly well baffled at this point. The inlet water is not controlled by a fixed weir, but an adjustable weir is sent out with the instrument, to be connected to the calorimeter by rubber tubing. The thermometers are on the same level, and the water flows during its entire passage opposed to the flow of gas. This calorimeter has given very good and comparable results with the best of others, but it is very limited in capacity and inconvenient to operate, as it is necessary to lift the calorimeter from the base to light it and observe the burning gas.

Slide No. 9.—Slide No. 9 represents the Simmance-Abady as first sent to this country, which was tested by the Calorimetry Committee. It is wooden jacketed and has the thermometers on the same level, but the great objection is that the flow of water does not always oppose the flow of gas. This calorimeter gave trouble by pocketing air in the water supply, and yielded very irregular readings of the outlet water.

Slide No. 10.—Slide No. 10 (unfortunately cracked) shows a Graefe calorimeter. This calorimeter has been introduced on the market as a cheap substitute for the present so-called high priced calorimeters. It is sold for $25 each, but gives results that are not at all comparable, and do not represent the true heating value of the gas. In the first place, the products of combustion leave at such a temperature that the water formed during combustion is carried off as vapor. This means that no reading above the net heating value can be obtained. There are other points about it that are likewise bad. In fact, consistent results cannot be given, as the outlet temperature of the gases is not controllable. The gas is measured in a graduated bottle by being displaced by water entering through the superimposed weir *A*, through the cock *D*. This means that, as the water rises in the bottle, the head of the water grows less, and that the flow of gas is irregular to the gas burner. The cylinder contains a measured quantity of water, whose temperature is taken by the thermometer, at the beginning and ending of the test. The readings in this instrument are known to be low and are multiplied by a certain factor to bring them up to that as indicated by comparative readings made with a good calorimeter. I would not recommend the use of such a calorimeter at all, as conditions are such that no consistent readings can be made.

Slide No. 11. This slide shows a calorimeter cabinet, or a method for installing calorimeters at the works or office. I believe that, if a calorimeter is installed permanently, always ready for use, kept clean and in adjustment, it will be used, and used regularly, and that the results obtained will be very consistent. Therefore, this cabinet was designed to produce conditions that are known to be necessary for good and uniform calorimetry. It will be noted that there is an overhead water tank of about 40 gallons capacity, which is sufficient to run the calorimeter for an hour at least. This tank should be filled when the operator has finished for the day, so that the water will be at the temperature of the room and ready for use when time to take the next reading. The thermometers need never be disturbed, and it will not be necessary to drain the water from the calorimeter when through using. When once adjusted, and all of the auxiliary apparatus leveled up and proved, it is simply necessary to unlock the cabinet, turn on the water, insert the gas burner, and, as soon as a thermal balance is obtained, begin a reading. This can be completed in 30 minutes under ordinary conditions. A number of installations have been made of this cabinet, and operators, after once having used the calorimeter erected in the cabinet, state that under no circumstances would they have it otherwise. The cabinet is kept locked and only accessible to the operator.

Slide No. 12.—In making the determinations it has been found that the results can be very quickly computed by a simple formula, which has been exemplified in a card slide rule, shown on Slide No. 12. This computer corrects the gas for barometer and temperature readings in a similar manner to the candle power computer. The difference in temperature between the average of inlet and outflowing water is given, and the pounds of water passed to $\frac{1}{10}$ of a pound is easily read on a scale and placed opposite the difference in water temperature. The corrected heating value of the gas is then read opposite the cubic feet of gas burned during the time of the test.

It has been found that burning at the rate of 4 or 5 feet an hour it is better to have the test cover two revolutions of the drum of the $\frac{1}{10}$ cubic foot meter, or $\frac{2}{10}$ of a cubic foot.

Slide No. 13.—Slide No. 13 shows a cabinet which contains a recording Junkers calorimeter. This cabinet was introduced last year by the Junkers people, and so far they have shipped only one to the United States. This apparatus contains a calorimeter proper, of the Junkers type, with thermometers for the inlet and outlet on the same level. The temperature for the recording instrument is obtained by means of thermal couples inserted in the inlet and outlet water, which generate an electric current, recording the intensity by means of a galvanometer, which is so graduated as to read the calorific value of the gas. The gas is measured in a wet meter and the water is likewise measured in a wet meter. These two meters are geared together, so that the ratio of gas and water is maintained constant. It will be seen that, if the ratio of gas and water is constant and fixed, the direct rise in water temperature will then be proportional to the calorific value of the gas, which is the principle adopted, and that, if everything is in adjustment, and nothing goes wrong, this recording instrument should produce correct results. It, however, is quite complicated, and, as far as I know at the present time, has not been practically tested in this country.

Slide No. 14.—Slide No. 14 shows a Junkers calorimeter as installed and erected by the Milwaukee Gas Light Company. This calorimeter was changed to have the thermometers on the same level and arrangements were made for weighing the water. This arrangement of a Junkers calorimeter was tested by the American Gas Institute Committee and found to give absolutely correct results, as compared with the best work obtained from any type of Junkers.

Slide No. 15.—This shows the installation of 2 Sargent calorimeters, of original design, erected for testing at the laboratories of the University of Wisconsin, where the work was carried on, covering a period of several months, by two or three investigators for the American Gas Institute.

Slide No. 16.—Slide No. 16 shows the Boys and Simmance-Abady calorimeters erected at the same place and for the same test.

Slide No. 17.—Slide No. 17 shows how the 4 calorimeters were erected side by side and tested simultaneously, using the same gas and the same water.

Slide No. 18.—Slide No. 18 shows a Junkers calorimeter that was erected and tested for general efficiency. This was done by inserting in the calorimeter an electric heater instead of a gas burner, which heater was designed so as to produce approximately the same quantity of heat as an ordinary Bunsen burner. The amount of energy electrically was determined by calibrated instruments, which gave an exact indication of the total heat introduced into the calorimeter. The water temperatures were then taken, the water weighed and the result of the heat absorbed by the calorimeter given. This arrangement indicated the general efficiency of the calorimeter, which, through a series of tests, was shown to be slightly over 99.5 per cent. and convinced us that we were working with an instrument that was an exact indication of the quality of the gas and also an instrument that was reliable and would produce results within the limits of all personal error.

Slide No. 19.—Slide No. 19 shows the electric heater that was used in the test just described. It consists of German silver wire wound around a mica support. The electric measuring leads were brought right in as close as possible to the heater proper, so as to reduce the loss to a minimum. This heater was mounted on an insulated rod, so that the loss through conduction was likewise reduced to a minimum.

Slide No. 20.—I am showing slide No. 20, as it represents the variation in heating value of a gas, as determined when operating the calorimeter with different temperatures of inlet water. In this particular instance the temperature of the atmosphere was approximately 70°, and the gas showed, when operating the inlet water at 70°, 500 heat units.

With water at 60° the gas showed about 602 heat units.
" " " 50° " " " 608 " "
" " " 40° " " " 620 " "

When the water was up to 80°, or 10° higher than the temperature of the air, the heating value of the gas was nearly 4 B.T.U.'s too low, and when the water was 90° the heating value of the gas was about 18 heat units too low. This shows the importance of having the water approximately the temperature of the room.

Slide No. 21.—I am showing this slide as indicating the relation between candle power and heating value of a carburetted water gas. While we know that the heating value of a gas has no definite pro-

portion to its illuminating value, still we know that the higher he candle power the higher the heating value, under similar conditions; but as the heating value varies in a relation that is comparative with the quantity of oil used to obtain this candle power, therefore, to obtain a uniform candle power throughout the year the quantity of oil must vary, and inversely as the temperature. Hence, the heating value will vary in a similar relation to the oil. This chart shows 1 year's record, with a uniform candle power of between 21 and 22 candles, the temperature varying from 20 to 70 heat units. The oil used is greatest in cold weather, running from 4.2 gallons per 1,000 in cold weather to 3.7 gallons in warm weather, the heating value running from 665 to 630. This is a very high heating value gas, and considerably above the general practice throughout the country.

Slide No. 22.—This slide represents an empirical formula to determine the heating value of a carburetted water gas, knowing its oil efficiency. This formula was worked up from actual results in half a dozen plants and gives approximately correct results, although it somewhat depends upon where the candle power is read and through what type of burner it is read. The formula is based on the fact that, without any oil admitted to blue gas, it has an approximate heating value of 310 B.T.U.'s. After that the heat given to it depends upon the quantity of oil and the candle power obtained, and it is figured out on the heat rise per candle power, assuming a certain constant for the oil efficiency.

Depreciation: An Item in the Manufacture and Sale of Gas.

[Prepared for the Sixth Annual Meeting of the Iowa District Gas Association, by MR. ROYAL SHACKLETTE, Detroit, Mich.]

There have been several able and exhaustive papers presented to various gas and electrical associations on the subject of Depreciation during the past 2 years, and my only reason or excuse for putting forward these remarks at this time is a desire to impress upon the management of some of the smaller properties, and perhaps a few large ones, the importance of making proper allowance for this somewhat intangible expense, but which expense, nevertheless, is unavoidable and must one day be reckoned within some form or other.

Depreciation, under which general name I also include "Obsoletion and Inadequacy," as well as "Deterioration," due to wear or the action of elements, is one of those items which is variously regarded by various people. There are few, though very few, who carry a reserve account to offset each capital account, charging in each month with a predetermined per cent. of the investment, or a unit charge per 1,000 made or sold. Others set aside a sum out of the annual gross profit, the amount depending on the showing made or desired to be made for that particular year, regardless of the physical condition of the property. Sometimes their intentions to make an adequate reserve may be good at the first of the year, and then the resolutions are forgotten or ignored at the casting up of the annual trial balance.

And there are still the great majority who do not consider it at all, but, in effect, trust to luck to provide them with fresh capital to replace worn out or inefficient equipment, and think nothing of it, until apparently excessive profits invite drastic rate regulations, and then we usually find depreciation a convenient handball for the respective experts. It is not to be wondered at that courts and juries treat lightly such an item, when the defendants themselves ignore it until they heed it as a defensive measure.

To accumulate surplus to insure regularity of dividends, or to map out any programme contemplating a revision of maximum or general rates, without giving as careful consideration to this item of depreciation as is given to raw material, labor, taxes or interest, is to fall short of our full duty to the investors and to the public. For if it is not taken into account the time must eventually come when additional capital will be necessary for replacement of worn out apparatus, resulting in reduction of security against outstanding obligations, and in saddling future customers with fixed charges, which should have been accumulated out of current rates to past users of our commodity.

When you buy an automobile and run it until it is worn out, before you have the total per mile cost of running that automobile, you have to divide the original cost of the car by the total number of miles you ran it, and add that to the per mile cost of operation and maintenance, to get the full story. Likewise, when a man buys 1,000 feet of gas, he should pay in the price of it for the proportion of capital used up in its production, as well as the direct current expense and interest. Of course, you cannot get at the figure exactly in advance, but experience has taught us to be a ble to approximate the probable life of various kinds of gas works apparatus, and certainly any compilation purporting to give the full per 1,000 cost of gas should at least include the best current estimate of what this very material item will amount to.

All State Commissions so far organized have recognized it as a current operating expense, as has the government in its new revenue tax report (see deduction marked 5-b on the report form). The Wisconsin Commission, in the La Crosse decision, concedes 3 per cent. to be a low rate of reserve for depreciation accounts, and I believe the New York Commission has in some case allowed 5 per cent. The Consolidated Gas Company, with its very high per capita sales, set aside 10 per cent. per 1,000 sold for this purpose. I think some of you would be astonished at what 3 per cent. on your investment would amount to in cents per 1,000 over your annual sales.

Of the various theories and accounting methods we will not concern ourselves here, but those in need of assistance in opening such accounts can find considerable and varied advice in the files of our technical magazines for the past few years. I would particularly refer you to an article by H. D. Grant, in the "Journal of Accountancy," March, 1910, and an address[1] by Mr. Edwin S. Mack, presented at the 1908 convention of the Wisconsin Gas Association.

Generally speaking, depreciation, like most other items, seems to have been reduced to terms of per 1,000 costs. The average accountant would probably do this without giving it further thought, but here we must be careful to apply business instinct rather than arbitrary practice, lest by so doing we hold back unduly the proper and profitable development of our business.

Depreciation on holders or street mains may very properly be omitted in computing the cost of gas to be furnished under certain circumstances requiring no additional capital investment therefor, or where such consumption, by levelling the load, might actually extend the adequacy of the existing holder storage; but depreciation, on such items as bench fillings or water gas linings, must be considered to apply equally over all gas sold, regardless of the circumstances of its distribution. Yet here, again, business judgment of keenest capacity is required to determine with reasonable accuracy when such specific consumption might cease to be profitable by reason of its necessitating larger mains or additional storage capacity, thereby being directly responsible and solely chargeable with the increased interest charges necessitated.

In our own practice, we segregate our various capital charges as retort house, benches (meaning thereby the arches and mountings), bench settings (meaning the furnaces, retorts, etc.), machinery, etc., etc., and for these various segregations, excepting bench settings, we have estimated the probable life of each, as say 10, 15 or 20 years, etc., and set aside monthly 1/120, 1/180 or 1/240 of the original amount. But for bench settings which have to be replaced each 3 or 4 years and not infrequently oftener, depending upon both the original quality and construction, and the care and intelligence exercised in their operation, we set aside 2 cents per 1,000 of all gas made, putting the sum so reserved into a replacement reserve as distinct from the depreciation reserve against our other capital accounts.

For mains and services we do not set aside permanent reserve against depreciation and obsoletion, but carry only reconstruction reserves, which we accumulate by charging operation in monthly instalments with 1½ per cent. annually of the invested value. Against the fund so accumulated we charge the repairs and replacement of mains, where the replacement is within one of like size. When, however, replacement is made with a main of larger size, the new main account is charged with the total cost of the new and larger main, and then stores account is charged with all material recovered from the old main at its fair value, and replacement reserves are charged with the differences between this value and the cost of the main as originally laid, and the mains account credited with the full amount.

With meters we charge all repairs to the maintenance and repair account as a current expense, carrying them at their full value until condemned, and then crediting this value of the condemned meter to the original capital account. This, for the reason that the condemned meter is not like a piece of apparatus, continuing in use with a lessening value, but is completely gone.

We have a double object in so handling mains, services and meters. First, that each may be said to give full value and efficiency until replaced; second, replacement is going on so continually that the

1. See JOURNAL, June 8, 1908, pp. 971-2-3.

amount in each year over a period will be so closely proportional to any other year that it will not upset the average charges.

In my opinion, all items of capital account should have their probable period of usefulness estimated by a competent engineer, and each month a sum set aside which will equal the cost at the end of the period, due allowance being made for obsoletion and extra hazard.

The expense of an occasional appraisal, by experienced engineers having no direct interest in the property, to determine current value and adequacy of reserve charges, is comparatively little, and may be worth many times its cost in the face of some proposed drastic legislative measure. Incidentally, I believe the fullest publicity, in connection with our operating methods, will go far towards ending much hostile legislation and lead the public to see that the public service corporation that gives good service is just as much entitled to liberal returns from its business as is the successful merchant or manufacturer, who certainly would not be content with a paltry 5 or 6 per cent. annual return on the amount invested in his own business.

It is my opinion that much ill-feeling has been engendered between public service corporations and the public whom they serve, and incalculable loss sustained on account of incomplete unit costs getting into the hands of ignorant or unscrupulous newspapers and magazines, these being published in such way as to indicate that they covered the total cost, or at least the approximate total. I have heard politicians argue that, because the manufacturing cost of which they had heard was only a small portion of the selling price, the maximum rates should be very materially reduced, or if there are low rates for consumption at times of low demand, that the maximum should be reduced to it. They, of course, assuming that the distribution and general cost were negligible quantities.

In an article in the Saturday "Evening Post," published while this paper was being prepared, I find these comments by Mr. Isaac F. Marcosso on the "Safeguarding of Securities:"

"Over-capitalization is an evil that every man and woman who owns, or expects to own, a public service security should know and avoid, because more financial havoc has been wrought by the payment for replacement with fresh capital while retaining the value of the replaced and worn out property on the books of the company as assets, than in any other way."

And, further, speaking of the New York Public Service Commission:

"They set up as one of the first and foremost requirements of the new uniform accounting system, that, instead of capitalizing renewals, the companies maintain a depreciation fund that will provide for it out of income, hence it ceases to be a capital account. Here is a precaution that works for the benefit of the travelling, consuming and investing public.

"But a larger service than preventing new capitalization is achieved, by having a permanent and constantly available fund on hand, equipment can be kept always in good repair, thus maintaining the integrity of the security behind the bonds, and at the same time affording the largest possible earning capacity."

How We Increase Gas and Electric Sales in Lincoln.

[Prepared for the Sixth Annual Meeting of the Iowa District Gas Association, by MR. J. E. SCHUFF, Lincoln, Neb.]

By a new business department, operated under a Doherty plan, by seeing every man, woman and child, and preaching gas for light, heat and power.

The city is divided into districts, with an agent representing the company in each. If you are selling electric light in addition to gas, have a power salesman. The power business in most companies is undeveloped and same must be pushed hard, for you will not find many power prospects come into the office. You must go out and demonstrate to your prospective customer. The power salesman can usually handle sign and outline lighting along with his regular work.

You must push electric advertising. Advertise with electric signs, outlining and spectacular window displays. Going into the different cities you always judge a new business department by the illumination of the city. A poorly lighted city denotes a poor department, and *vice versa*.

The Residence Salesman.—They are the ones with whom the women have to deal. The Lincoln Company, a few years back, ran free services into the houses; but at the present time charges for same are made, and we are putting more services in than when same was done free.

A company should never give anything free, and do not let your agent lose sight of increasing sales and vitalizing dead services. We specialize on different lines each week, for I do not think a salesman can sell 8 or 10 different appliances at one time. Therefore, I say, lay out a plan—then work the plan.

The agent should know good business from unprofitable business. There are two kinds of consumers: one who uses nothing but gas, the other who uses it just for summer use. We must talk for all modern homes. Keep the coal range out! See the builder and contractor when buildings are started and just talk the modern way—"Cook with Gas!"

Handling Complaints.—The handling of complaints is one of the most important lines of work connected with a new business department. We must not lose sight of our old consumers. A salesman calling on an old consumer finds out if service and treatment are satisfactory. The adjuster between the company and consumer should have charge of complaints because he knows the conditions; knows the man or woman with whom he is dealing. A live salesman always leaves the consumer satisfied with his treatment, and we know of very few cases where they are when same has been adjusted at office. If the consumer does not get his complaint adjusted he becomes a kicker or a knocker, and always tells of his treatment. But you will find very few who will kick to a solicitor, for in doing same he finds out from the party to whom he is kicking that he had the same complaint and everything was adjusted "O. K.," whereupon he says, "See the solicitor and your trouble will be adjusted, as mine was."

The Fitting Department.—Setting meters and connecting appliances constitute a department by itself, that must work hand-in hand with the new business department.

A fitter should know his business. He, like the salesman, comes in contact with the public. He must have tact and judgment. Do not talk too much, but know the conditions. Leave everything that he does "O. K." If a meter is set see that same is set right. If a gas range is connected, see that same is connected and adjusted properly. In fact, be on the job all the time. A live agent is always in close touch with a fitter, and they should work hand-in-hand, for this job depends upon the other.

It is often a good plan to offer the fitter a bonus for tips that he may turn into the office, and if same is closed allow him a fixed price for it. Get him interested in his work. Make him think more, and before long he becomes a live wire and wants to get into the new business department, and they often make good salesmen.

Salary.—A solicitor should be paid a living salary and in addition a commission, and a commission should be based on his earning powers, using a point system to adjust same. On installing an appliance where a consumer is using gas he should get what we term 10 points on each dollar revenue per year; where he takes a meter order he only gets 2 points per dollar revenue. So you can see, between the two classes of business, the agent would go after the 10 point business, and that is what the company is after. A person who merely wants to get a meter put into his home will hand the order to agent or leave it at office, and if agent's name is not on the application he does not get credit for the order. Therefore, he will get most all the meter orders in his daily calls, not wasting much time on them, but will get the more profitable business for himself and the company with which he is connected.

In addition to an agent's regular salary and commission we sometimes offer him a bonus in this way: Say for each gas range he sells above a certain number we will allow him $1; and do not set the mark too high. Let him make $25 or $30. In doing that you get his confidence and he gets yours; and the company and the solicitor must always get together and believe in each other.

The Art of Checking Your Solicitors.—He should be required to make daily reports, number of calls made, name of party calling on, nature of business and what results from daily work.

Advertising: Window and Office Display.—Do not spend too much money in the newspapers. Have more salesmen. You must make the office and windows attractive. Let outside merchants use your windows for displaying their goods: Cakes, baked in a gas range; or a gas engine for power; demonstrating the gas iron or mangle. Show the public what you can do with gas and do it at your own office.

Let our motto be, "Cook with gas all the year round. It is safe, cheap and easy."

The Gas Company's Policy Towards the Public.

[Prepared for the Sixth Annual Meeting, Iowa District Gas Association, by MR. CAMPBELL W. FAIR.]

Many years ago the President of the New York Central Railroad was hastily summoned to Chicago. On the outskirts of the city Mr. Vanderbilt's car was boarded by a representative of a large daily, who demanded news on behalf of "the public." Resenting the intrusion, it is quite likely the old Commodore said something uncomplimentary to the enterprising individual, and possibly he made the remark with which he was credited in the next issue of his uninvited guest's paper, "The public be damned." Whether Mr. Vanderbilt said it, or whether he did not, is immaterial but; the fact remains that for nearly 40 years the phrase was popularly considered as indicative of the attitude of all great corporations (including public service companies) towards their patrons.

But times have changed. Upon the opening of the Hudson river tunnels between New York and Jersey City, July 19th, 1909, William G. McAdoo, President of the Hudson and Manhattan Railroad Company, delivered a speech, in the course of which he said:

"We believe in the 'public be pleased' policy; we believe that the railroad is best which serves the public best; that decent treatment of the public evokes decent treatment from the public; that recognition by the corporation of the just rights of the people results in recognition by the people of the just rights of the corporation. A square deal for the people and a square deal for the corporation. The latter is as essential as the former, and they are not incompatible."

There is no question but that the gas companies here represented are without exception operated by men whose point of view is identical with that of Mr. McAdoo, and that, while methods may differ and local conditions may tend to make the problem a more difficult one at times, all are striving to render the very best possible service, thereby deserving the respect and goodwill of the public. The inexcusably poor judgment and short-sightedness that would be displayed by a company attempting to conduct its business on any other platform is at once apparent, when the self-evident facts are recalled that at all times it is the public that is master and that public sentiment can come close to ruining a utility business. Ever must it be borne in mind that in this country the people rule, and that that system, that method or that personality to which the public does not subscribe cannot succeed. The government is the people, and all public officials, legislative bodies, and even the courts to a great extent, are keenly alert not to run counter to public sentiment.

This being the case, it is the first duty of the gas company managers to conduct their business in a manner that will meet the approbation of their consumers. Absolute perfection of operation, with everyone satisfied and contented cannot, of course, be attained, but approximate perfection is not impossible. In addition to sending out a good quality of gas at all times, and distributing it under conditions that will permit of the least annoyance, it is essential that our consumers be treated with that consideration and courtesy that will merit their co-operation and confidence.

The entire business world rests on a foundation of confidence. Unless one knows a man personally, one is not apt to have confidence in him, and the same is true of a business house or corporation. Lack of confidence is for the most part due to ignorance, and so the greatest promoter of confidence is publicity. We must be frank with the people and show them that we are conducting a legitimate business in a legitimate way, respecting the rights of all and showing special favors to none; that there is no occasion for suspicion or prejudice, and that the days of "Take it or leave it alone," and, "Well, what are you going to do about it?" are now ancient history, if there ever were such days in our business, We should throw open our works to the curious and let them, under proper escort, search for the pipe through which it has been said the air is pumped. The "No Admittance" sign should be hung only on the safe, and the door of the purifying house, and anyone can be allowed to inspect the latter if he isn't smoktng. If a change is made in the manner of conducting the business, tell candidly and in detail why it is made and what it is hoped to be accomplished by it, and if a new piece of apparatus is installed, publish a description of it explaining what it is for and how it works. Get in touch with the people and make them talk about what you are doing. If you are making news the papers will print it, and the people read the papers. The knocks are bound to get in print, and practically all the eroneous information is derived from the same source, so why not anticipate the knocker and get a good boost in the sheet from time to time? Let me illustrate. In Omaha recently I found in *The Bee* a column headed:

Around New York.—Ripples on the Current of Life, as Seen in the Great American Metropolis from Day-to-Day.

One of the "Ripples" ran as follows:

"Certainly things are progressing," said a householder. "Men around yesterday from the gas company asking if there was anything the matter with our gas range. We hadn't sent for them, you understand; they just came around on a house-to-house canvass to see if there was anything that needed doing and to do it if there was; to put the range in the best possible working condition. Fine business this; looks like trying to please their customers. And I think there may be noted in these days various signs of enlightenment on the part of public service corporations, showing a desire to get acquainted with and to deal fair with those with whom they hold relations. Certainly things are progressing."

Now, that paragraph, in the same issue, if not on the same page, with one of the U. G. I. "Gas Service" ads., could not fail to make an impression on the reader that will eventually accrue not only to the advantage of the Omaha Company, but to your Company and mine. To what is the success and the freedom from attack and litigation of the great United States Steel Corporation due, if not to the fact that all the details of that enormous business are available for publication, and that Judge Gary is trusted by all classes?

And as the Steel Trust is weighed and measured by the personality of Judge Gary, so, too, are the success and standing of the gas companies determined by the zeal and popularity of you and me and our subordinates. This is especially true in the smaller towns; but all companies are judged by their employees. Do we not often lose sight of the necessity of having all employees, whose work brings them into contact with the public, fully realize that civility, patience and courtesy are of the greatest importance, and that, as employees of the quasi-public corporation, we are virtually public servants. By example their superiors must show the boys that, although it requires a lot of patience to be polite to people who may be rude and insulting to us, and it is human nature not to be, it is part of our job to treat people courteously, no matter how they treat us; and that, in a highly complex and technical business such as ours, there are many things with which we are perfectly familiar, but which the public does not understand at all. Therefore, when they inquire concerning them, our reply should be as full and clear as we can make it; and that a kindly, gracious manner is quite as important as the choice of words. The lasting impression made by a meter reader, who tells a consumer gruffly to "Call at the office; I ain't got no time to bother with that," is equal to that made by the Weslbach inspector who enters a home with mud on his boots or a pipe between his teeth. Either individual will counteract in a moment all the good work done by the tactful representative or order clerk.

We all realize, or should realize, that much work has to be done for which we receive not even a word of appreciation at the time; but it all counts in the long run. And the company that has rendered good service, day-in and day-out, has had its men on the job all night if necessary in severe weather, has kept its appliances in first-class working order, and has treated those with a grievance in a conciliatory spirit, conforming to their thought whenever possible, and not claiming to be always in the right, has an asset the value of which cannot be overestimated.

All of us have on our books the refractory, obstinate fault-finder, who kicks at home and growls all day at the office, and we cannot expect to escape him between times. Likewise, we are familiar with those penurious persons who never pay a bill of any kind without becoming volubly alarmed over the conditions obtaining in the country in general and around the office of their creditor in particular. Such people, like the poor, we shall always have with us; but what do they really amount to beyond being a part of the day's work, constituting as they do a most insignificant part of a community. Greet them with a smile and agree with them in everything they say, up to a certain point. Humor them and endeavor to get them in a happier frame of mind before attempting to prove to them, by object lessons rather than by argument, that they are mistaken, and that the company is in reality not the cold-blooded, heartless monster they claim it to be. We can always control ourselves with the recollection, after such people have gone their way, that the vast and overwhelming majority of our consumers are fair ahd just and return decent treatment in kind.

And what, may we not pertinently ask, is to be the policy of the public towards the gas company? Over the enterprise is a board of aldermen, generally without technical knowledge or experience in the gas business, to stand supreme, and is the business to be a football for professional agitators, and politicians whose sole aim is to start a discussion that will keep themselves in the public eye? I think not. Of course, the reformers, those misguided men of whom it has been said that they wore rubber boots and stood on glass when God sent a current of common sense through the universe, will always be at large; but the great mass of solid and substantial citizenship is becoming thoroughly disgusted, I take it, with the demagoguery of the politicians who are constantly seeking to make capital for themselves out of corporate affairs. And one day we will be given that expert supervision, at the hands of practical men of unquestioned integrity, impervious to the influence of political expediency, which has proven so successful in Massachusetts and Wisconsin. Such reasonable and intelligent supervision is welcomed by public utility companies in the main, for the responsibility of those in charge is so great that they should be glad that some properly constituted authority should say from time-to-time to both stockholders and the public that the reports are correct and that the business is being ably and properly conducted.

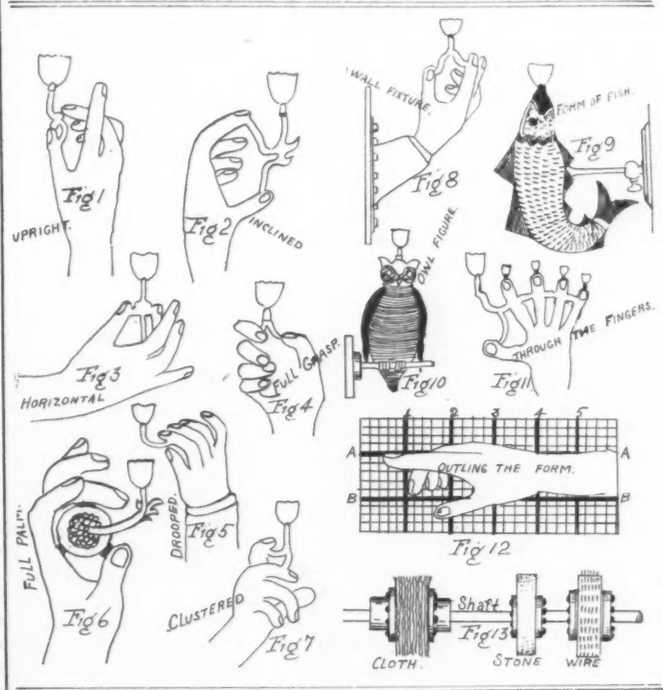
Taking this discussion by and large, I am reminded of the reply of the late Thos. Brackett Reed, when asked for his opinion of Roosevelt. "Roosevelt," said he, "Theodore Roosevelt; why I esteem him very highly indeed. But what I admire most about Roosevelt is his enthusiasm over his discovery of the 10 commandments." I have told you nothing new, and what I have said could have been said much better by another; but if, in the discussion that will follow, suggestions and ideas that will prove helpful to you are brought out, the time I have taken up will not have been misspent.

Forms of Hands and the Like for Hall and Room Lights.

[Communicated by "ENGINEER."]

Of late one can easily note quite an impetus in shapes of hands and related forms for supporting lights in halls, studios, arches and rooms in general, and this line of gas light architecture has advanced to such a stage that I feel it is warrantable to describe some of the technique of the same. The demand for lighting fixtures in the past several years has been quite different from that of previous years. While the plain, staid fixtures are still in active service, and no doubt always will be, there are certain classes of people who require that their homes be fitted with something else. They always seek for something different from anything ever used or thought of. Of course, there are records to show that the old kings of ancient times utilized forms of hands, feet, arms, legs, beasts of the field and fowl of the air in various stone and metal conditions, for holding fixtures through which fumes passed for burning, or to which candles were affixed and lighted. Beasts with upturned jaws shot forth flames to light places. Reptiles were carved in correct imitation of the real thing, and fixed so as to shoot forth light from the green, red or other colored eyes. In the present age we are inclined to neatly and gracefully outlined hands for holding lighting jets in hallways. Let us see how the artisans produce these types of burners with the attractive hand in bronze, brass, nickel, iron, wood or other stock. I find that many cast iron hands are used. These are cast hollow and are not very expensive. Some of them are painted a jet black with asphaltum, and some are modelled from glass, and as these can be cast in moulds they are not very costly. The wooden hands are manufactured by tedious labor with sharp pointed tools. An expert artisan is needed to do the work properly, therefore the expense of the wood hand is high. Again there are hands moulded from clay and coated with an enamel, which are moderate in price, but not lasting in nature. Brass hands are extremely costly, if there is much weight, and also the excessively expensive bronze and like metal hands, all of which find sale somewhere, for I am told that the demand is usually equal to the output—the demand has been on the increase.

The attached illustrations will give the reader an idea of some of the popular descriptions of hands as used in connection with supporting burners. The object is to get a design which shall be neat and attractive. I have seen some very cumbersome looking hands put out. Some of them are not at all in line with the requirements. Besides the outline of the hand, the form has to be adjusted so as to accommodate the pipes for carrying the gas and for supporting the burner with its tip. Often several burners are needed for the single hand, and then a number of fingers are used; but as a rule the single tip is ample. In Fig. 1 is shown one of the popular styles of hand-supporting hall jets. It will be noticed that the combination for conducting the gas to the tip is a part of the hand. The hands are shaped nowadays to accommodate the passage of the gas. Instead of the gas fitter damaging the hand by cutting into it for tapping for a pipe or burner, he finds a gas connection in readiness for him, and does not have to put the hand in a vise and use the thread cutting tools for tapping. The piping joints are cast with the hand, and this is a part of the business of the modern designer of hall ornaments for supporting gaslight jets. Hence in Fig. 1 we can see that there is a union between the thumb and second finger. The gas passes into the hand through the arm and wrist, thence up through the thumb to the connection-union to the jet. Sometimes the pipe extends through the arm and hand and connects at the outlet to the thumb or other finger, with the exterior jet. In Fig. 2 is shown another style of hand for the hall or room light. In fact, these forms may be found in service in show windows of stores, in business offices and many other places. The mechanical structure of this hand is kindred to that of Fig. 1, only that the form of the fingers is varied. There is another style in Fig. 3, which is to meet the demands of a shape which shall extend horizontally as shown. In Fig. 4 is displayed the type of full-grasp



hand which is used in some cases. This style involves the full clasping of the fingers about the fixture. In Fig. 5 can be seen the drooping design of hand which is preferred by some for hall or room service. The special feature in the design is the drooping character of the fingers. Then there are some people who select the style of hand exhibited in Fig. 6, in which the palm of the hand is utilized to support a disk. This disk is connected to the line of pipe through the arm and hand, and the exterior carries the projected pipe and jet as shown. Then there are hands which are modelled after the "cluster" plan, presented in Fig. 7. This style gathers the fingers of the hand together as shown, and two of them are employed to carry the pipe which supports the upright burner. Many of the hands are arranged for fixtures to a wall, post, pillar, side of hall stair rail, in a wall frame, or on the hat rack in front. The fixture of this order is presented in Fig. 8. Often the connection with the wall pipes can be made quite readily in cases of this kind, more so than when uprights are used from some point in the floor direct. In Fig. 9 is shown the form of a fish, for there are people who select designs to harmonize with their special requirements. In this case, the man was of sporting inclination, and had forms of deer horns and pictures of ducks about the house. The form of the fish was made of soft metal and fixed to the gas jet as shown. In another house I observed an owl supported on the gas fixture, and joined thereto with pipes to carry

the gas to the jet above. I saw a sprawling hand in one room, on which a number of jets were placed as shown in Fig. 11, and the display was interesting, although not artistic. Suppose I make a few suggestions concerning the designing of the hands for this purpose. One good way involves the use of design paper which is marked off, as in Fig. 12—this ready-ruled paper can be purchased at any dealers in artist's materials. Then, following the squares, you can define your guiding lines for the hand, after you once get the form from the model. The thing can be worked out readily without very much explanation. Find your defining points and make your pencil lines from point-to-point, until you finish the form. Then strike it on in ink and you have the model for the artisan to work from.

In Fig. 13 is illustrated some of the contrivances used for burnishing the metal hands. The cloth wheel is made of disks of wool fabric bolted together and arranged for revolving on a shaft. This shaft is turned speedily, and when the hand is held securely on the turning surfaces of cloth, polishing results. A stone disk is also used for hard grinding and a wire-filled disk for getting into crevices of the forms.

Disqualified Pipes and Connections.

By "R."

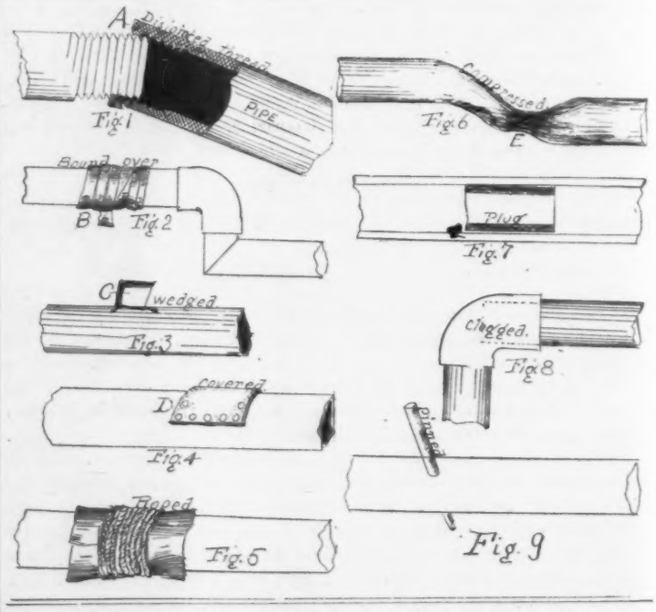
In almost every house lives someone who knows enough of mechanics to tinker with gas pipes and connections, but this tinkering is often quite disastrous to the piping system of the house or office building. Janitors often injure pipes, meters, tanks and related devices in their efforts to make some changes in the pipes, or to install a new part. The same trouble prevails in the gas and gas piping business as exists in the automobile employment, and an inexperienced man will put a finely adjusted automobile out of commission very quickly. I have seen first-class pipes and adjoining apparatus sadly distorted by the careless handiwork of persons who had no right to monkey with the parts. Still, of course, there are excuses for tinkering with the pipes oftentimes. For instance, when a pipe begins to leak, and the man of the house detects the point of leakage with the dangerous torch, he feels that he is competent to make a few adjustments, stop the leak and save the cost of the repairing by an experienced man, with the result that the gas companies have more or less trouble all the time. In some cities and towns there are numbers of the company's men always out among the users of the gas to closely watch things, and if there is anything wrong these agents are quick to detect it and effect a remedy. No such precaution is taken by the smaller concerns in the country towns, and, regardless of the care involved by the gas manufacturing concerns, either in the city or the country, there are always certain fractures in piping systems which are repaired or patched improperly. Not long ago I noticed a party tinkering at a gas pipe joint. As the two ends of the pipe passed through partitions, and as one partition wall had settled a little, one section of the gas pipe drooped so as to prevent the joining of the threads correctly. But the man inserted the end into the joint of the corresponding pipe and proceeded to screw the same, with the result that he got an adjustment similar to that shown in Fig. 1. The threads were thrown out of line, as shown at *A*, but the man turned the joint as far as possible and let it go at that. Of course, leakage resulted and a regular pipe fitter had to be sent for, as he should have been in the beginning. In order to restore this union to proper shape the threads of the pipe had to be recut.

Persons not accustomed to repairing leaks in pipes in houses or factories should not attempt to do so; but the precaution is not taken. There are always persons who will strive to fix things for the sake of tinkering, or to save the expense of a gas pipe fitter's bill. Hence, in one home where a pipe leaked I found that the fracture in the pipe was first gummed up with soap, then a strip of banding was bound about the place, as at *B*, Fig. 2.

I have seen men express their delight because they may have stopped a leak for the time being by winding it like this. It is a slipshod method of doing things and should not be tolerated; but such things are done even in well regulated homes. Of course, the banding works free in time, leaking begins again, and usually the second time the gas company is notified and a man who understands the repair work appears on the scene to substitute a new section of pipe for the split one. I once saw a fracture in a pipe closed for a time by means of a slim wedge of steel driven in, as illustrated at *C*, Fig. 3. Then some rosin was plastered about the edges and the leak was checked for a little time. However, soon the odors of gas were noticed and trained workmen had to come and remove the entire joint, replacing it with a new strip of pipe.

Sometimes persons will go to the trouble of piecing on a patch of sheet metal, as at *D*, Fig. 4. This is another crude way of repairing a bad place in a gas pipe, and it cannot be done unless the fracture is near the end of the pipe, for it is necessary to insert a mandrill so as to head up the rivets. While a patch like this is strong, and usually effective, it is difficult to use it, because of the need of drilling rivet holes. You will discover that some bad places in gas pipes are covered with wrappings of leather or felt, as shown in Fig. 5. The application of a gummy material closes the splits or holes and the binding of cloth, or other stuff, with cords, raw hide or wire makes quite a firm emergency fixture. It is not intended that a repair job of this character be lasting. The calculation is to bind up a leak, then get to work and fix it right with new parts when convenient.

There are not only the leaks to contend with, but collapsed pipes and twisted sections are often encountered. Sometimes the walls of pipes are crushed by the action of the partitions or floors through which the pipes may pass. In this age of competition among building contractors, edifices are often thrown up before the lumber is thoroughly seasoned, with the result that the lumber is strained and warped in the finished structure. The piping which happens to extend through such stock gets crushed, bent and distorted. Fig. 6 shows



the condition of a gas pipe crushed in this way. The best, in fact the only way, is to remove the section and replace it with a new one. However, I have seen such places restored by heating the pipe at *E* with a Bunsen burner and straightening it. Then a rod of the size of the interior of the pipe is driven through to expand the wall of the pipe to the right proportions. Pipe plugs are a bother. If inserted, as shown in Fig. 7, to check a pinhole leak in the pipe, the passageway of the pipe is cut off just this much and the flow of gas hindered. Concerning the checking of the flow of gas, the proprietor of a dining room reported that he was unable to get the usual supply of gas for his table lights. An examination revealed the condition shown in Fig. 8. It seems that the joint had sprung a leak. One of the workmen of the place then turned the threaded section of pipe into the elbow until the threaded section protruded into the elbow to the extent of almost checking the flow of the gas, as represented by the dotted lines. Upon removal of this combination the flow was corrected. One often finds pins driven into leaking holes in pipes, as in Fig. 9. I saw a wire nail used and driven with such force that the point of the nail passed entirely through, coming out below. Soldering is better than nailing up pinholes, as all know; but it is not possible for the gas pipe fitter to control the actions of the home artisans. About all he can do is to be ready to repair any damage which may be done by the tinkerer.

MR. S. W. MILLER, formerly in the engineering division of the Brooklyn Union Gas Company, has been appointed Superintendent of the Annville and Palmyra Gas Company, of Palmyra, Pa.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

961,763. Process of Purifying Gas and Recovering Ammonia, etc., therefrom. F. J. Falding, New York city, assignor of one-half to W. R. Cathcart, Maywood, N. J.

961,764. Process of Utilizing By-Product Metallic Salts and Ammoniacal Liquor. F. J. Falding, New York city, assignor of one-half to W. R. Cathcart, Maywood, N. J.

961,904. Automatic Gas Cut Off. J. H. Skillcorn, Pittsburgh, Pa.

961,959. Attachment for Gas Fixtures. U. K. Herfurth, Philadelphia, Pa.

962,051. Gas Retort Furnaee. E. L. Rieha, Milwaukee, Wis.

962,216. Feeding Device for Producers. C. A. Harvey, Chicago, Ills., assignor, by direct and mesne assignments, to Producer Gas Utilities Co., same place.

962,289. Gas Cut-Off. J. F. Wells, Pinkstaff, Ills.

962,378. Safety Gas Cock. J. T. McDermott, Baltimore, Md.

962,384. Container for Incandescent Mantles. H. C. Plimpton, New York city, assignor to Single Service Package Corporation of America, same place.

962,472. Gaseous Fuel Burner. H. Schneider and C. Schneider, Lima, O.

962,503. Gas Pressure Regulator. W. A. Fenton, Sioux City, Ia.

962,610. Vaporizer for Gas Producers. B. M. Aslakson, Salem, O.

962,611. Constant Supply Device for Vaporizing Fuel Gas Machines. J. F. Barker, Jr., Boston, Mass., assignor to Gilbert & Barker Manufacturing Company, Springfield, Mass.

962,648. Automatic Shut Off System for Gas and Liquids. C. D. Miller, St. Joseph, Mo.

962,752. Gas Stove. T. M. Dudgeon, Avalon, Pa.

962,834. Gas Burner. G. Helps, Ansley, Atherstone, England.

962,959. Gas Regulator. G. A. Hout, Crestline, O.

962,971. Burner. G. J. McPherson, Salt Lake City, Utah, assignor, by direct and mesne assignments, to International Oil Gas Producer Company.

963,157. Automatic Cut-Off for Gas Service Pipes. J. C. Klassen, Kansas City, Kas., assignor of one-half to J. A. Wisherd, Stanton County, Neb.

963,251. Safety Burner. E. Roth, Schoneberg, near Berlin, Germany.

963,401. Apparatus for Removing Tar from Coal Gases. E. Solvay, Brussels, Belgium.

963,484. Apparatus for Gas Analysis. G. M. S. Tait, Montclair, N. J., assignor to Gas Power Company, New York city.

Items of Interest
FROM VARIOUS LOCALITIES.

ARRANGEMENTS have been made by the C. W. Hunt Company, of New York, whose coal handling, conveying and hoisting machinery is practically exemplified in many gas works, under which their business on the Pacific Coast will be handled by the San Francisco Bridge Company, with offices and headquarters in the Monadnock Building, San Francisco. The Company has just completed a naval coaling station in San Francisco Bay on Government account.

AT a special meeting of the shareholders of the Worcester (Mass.) Electric Light Company, held in the Faraday street office last Tuesday, it was voted to petition the Board of Gas and Electric Light Commissioners for the right to make an issue of additional stock. The proceeds of the proposed issue, according to the statement of the Directors, will be applied in the main to enlargements planned for the generating station.

"W. R. B.," writing from Oklahoma City, under date of the 7th inst., incloses the following: "Overruling the objection of the defendants, Superior Court Judge Munden this week passed the injunction suit of Agnew Davis against the Oklahoma Gas and Electric Company until the 8th prox. The defendant excepted to the continuance, but Justice Munden held there were questions in the case which should be passed upon by a jury. It was also argued that the Corporation Commission had a similar question pending, which the defendant claimed had no relative connection whatever with the case. Complainant is asking the injunction against the Company on the allegement that the prices charged for gas by the defendant are unreasonable and excessive."

MR. GEORGE W. MANSFIELD, Superintendent of the Salem (Mass.) Gas Company, sustained serious injuries the night of the 6th inst., while attempting to extinguish a small blaze in the works, using a patented hand fire extinguisher. The latter exploded, inflicting severe injuries on the body of Mr. Mansfield. He was at once removed to the Salem Hospital, where it was reported that his condition was critical.

THE annual election of officers in the Commercial Club of the Boston (Mass.) Consolidated Gas Company were held the evening of the 7th inst., with the following result: President, C. J. Connell; Vice-President, W. E. Copithorne; Secretary, J. J. Salm; Treasurer, A. E. Kingsworth; Executive Committee, J. A. Anderson, J. W. Price and M. E. Hoppelhower. After the regular order of business had been completed the Club and its guests shared in a first-class banquet-reunion, covers for which were set in the Revere House.

AT the annual meeting of the Louisville (Ky.) Gas Company, Messrs. W. H. Edinger, H. B. Loving, D. X. Murphy, F. L. Sackett and John Stiles were elected Directors.

THESE are the main features of the franchise to which the Houston (Tex.) Gas Company expects the local authorities will give their sanction: A franchise to run for 30 years, and the right to connect with any other system that may agree to supply it with artificial or natural gas. In return for which privileges the Company agrees to institute the following selling schedule: To take effect September 1st., a net rate of $1.10 per 1,000; March 1, 1911, $1.05; March 1, 1912, and thereafter, $1. The city is further to receive as a royalty 1 per cent. of the Company's gross earnings, and the city also reserves the right, on the expiration of the franchise, to acquire the plant at the fair and reasonable replacement value thereof.

"VAN." forwards this mention from Vallejo, Cal., under date of July 5th: "Although the Pacific Gas and Electric Company has expended over $100,000 on the improvement of the local plant since purchasing it from its former proprietors, the new owner proposes to expend many additional thousands on the big plant until it is brought up to-date in every respect—Vallejo continues to grow wisely and well. All of the old buildings at the foot of Marin and Sonoma streets are being replaced by modern corrugated iron structures, and the latest and best accredited machinery is being purchased and housed. The reconstructing of the entire pipe system throughout the city is another undertaking that will absorb a large sum of money. Every service pipe in Vallejo is to be renewed, and in the near future the old ¾-inch pipes will be replaced by pipes of 1¼-inch diameter and upwards. It is likely that all these things will not be completed until 1912, but when *finis* is written, Vallejo will have as complete a gas service as that enjoyed by any other community on the Coast."

MR. E. L. PEARSALL, since 1908 in charge of the Commercial Division of the Altoona (Pa.) Gas Company, has been appointed Manager of the Commercial Division of the Union Gas and Electric Company, of Bloomington, Ills.[1]

MR. W. C. SAMPSON, formerly connected with the Watertown (N. Y.) Gas Company, has been appointed to a responsible position with the New York and Richmond Gas Company, Stapleton, Staten Island.

MR. J. R. ANDERSON, formerly a resident of Pasadena, Cal., who was recently granted franchises for supplying gas to Ashland, Phœnix and Medford, Ore., declares that he will commence the supply by September 15th. The plant proper will be located between Ashland and Medford, and it is proposed to supply Phœnix and Talent. High pressure will be followed and crude oil gas will be furnished. The Anderson syndicate declare that they will expend $175,000.

MR. H. L. CHANDLER, Manager of the South Side Gas Company, which is to supply gas to the towns of Mesa and Temple, Cal., asserts that he will be ready to supply gas by October 1st. An oil gas system is being installed, up to a producing capacity of 100,000 cubic feet per diem.

1. This in correction of our mention of his changed field of work, as printed in our issue for last week.

MR. CHAS. M. COHN, General Manager of the Consolidated Gas, Electric Light and Power Company, of Baltimore, Md., with a view to familiarizing the customers of that corporation with the working and use of a gas meter, has had an all-glass case meter made by the Maryland Meter Company, and has it placed on exhibition in the Company's main offices, where it is inspected daily by scores of the consumers. It is connected-up and performing its functions as if it were on or in the premises of a consumer.

MANAGER F. E. NEWBERRY, of the Citizens Gas Company, of Kankakee, Ills., which property we recently noted had been acquired by the Kelsey-Brewer syndicate of Grand Rapids, Mich., will not be retained in that position. This will be regretted by many, for Mr. Newberry did much to advance the gas interests at Kankakee, under the ownership of the Street-Wykes syndicate and later on under the management of the Maltmanns. Mr. Newberry recommended to the latter many changes, but as these were not practical men in the industry, the propositions were negatived. His successor is Mr. F. A. Willard, of Red Wing, Minn., whose knowledge respecting gas operations is sure to be enlarged through the lessons that will be taught him in Kankakee. Meanwhile it would not seem out-of-place to remark that Mr. Newberry should not remain out of a position for any length of time; for he certainly is a careful, capable manager.

THE Gas Machinery Company, of Cleveland, O., is under contract to erect a 9 foot set of water gas apparatus on the plant of the Wilkes-Barre (Pa.) Gas and Electric Company. It is also decided that the contract shall include an exhauster, tar extractor and all the necessary connections.

THE tie-up of the gas and electric interests of Palmyra, Newark, Lyons and Clyde, N. Y., has been completed. The title of the succeeding corporation is, Wayne County Gas and Electric Company, capitalized in the sum of $240,000.

THE death of Mr. Paul E. Schneider, a pioneer in the gas stove industry of Cleveland, O., is reported. Deceased, whose death occurred at his home in Bedford, O., the morning of the 23d ult., was in his 66th year, having been born in Mayence, June 27th, 1844. In 1873 he settled in Cleveland, O., having learned the trade of a machinist, and there started in the manufacture of a gasoline burner patented by him. His partner in this venture was Mr. Henry Trenkamp. In 1882 they engaged in the manufacture of gas stoves, in which they were eminently successful. It was largely through Mr. Schneider's efforts that the present gas stove trust, known as the American Stove Company, was formed in 1902, which concern now quite completely dominates the trade in these useful adjuncts to the business of our gas companies. Likely the independent who tried now to get on in the gas stove business would find it difficult to make any sort of headway. Mr. Schneider amassed a fortune, and his home in Bedford, O., is noted amongst the many beautiful homes that are to be found in Northern Ohio. He is survived by 3 daughters and a son, Alex. Frederick Schneider, Superintendent of the Best Foundry Company. The funeral services were held in the Trinity Evangelical Church, Cleveland, the afternoon of the 25th ult., the Rev. August Kimmel officiating. Interment was subsequently made in Bedford Cemetery. For the main facts in this history we are indebted to the courtesy of Mr. Pierre Plantinga.

EARLY this month, United States District Judge Van Fleet, sitting in United States Circuit Court, San Francisco District, issued an order against the Mayor and Board of Supervisors of San Francisco, to show why they should not be restrained from enforcing the ordinance just passed, which puts the rates to be charged for gas by the Metropolitan Gas Light and Power Company during the fiscal year 1910–11, at figures (90 cents per 1,000 cubic feet) which are unreasonable in that they do not allow the Company a reasonable compensation for the service. Further, that the ordinance, if enforced, will operate as an unlawful confiscation of property without just compensation. The defendants were also notified to appear in court on the 1st prox. to answer the bill of complaint, and to set forth their reasons why the ordinance should not be declared invalid.

THE little Newtown Gas Company, of a similarly named section of Brooklyn Borough, New York city—the fortunes of which are controlled by the Brooklyn Union Gas Company—is engaged in constructing a gasholder up to retaining 10,000,000 cubic feet. It is to be 250 feet in diameter, and is to be constructed by the Bartlett-Hayward Co.

MR. WILLIAM L. CLARKE, formerly Secretary, Treasurer and General Manager of the City Gas Company, of Paris, Ills., has accepted the position of General Manager of the Southern lighting properties which are controlled by the Maloney syndicate of Philadelphia. In the collection these concerns are included: Florence Electric and Utilities Company, Darlington Gas and Electric Company, Marion Light, Heat and Power Company, and the Rock Hill Water and Electric Company. The named places are all in South Carolina.

AT the annual meeting of the Milwaukee (Wis.) Gas Light Company, the officers elected were: President, A. P. Lathrop; Vice-President, Sheldon J. Glass; Second Vice-President, Nelson P. Hulst; Secretary and Treasurer, E. Haase. The usual semi-annual bonus of 10 per cent. of their wages, for the 6 months ended June 30th last, was ordered paid. This bonus is given to all employees, save those in the executive class, the only requisite to sharing therein being that an employee must have been in the Company's service a year prior and regularly thereafter during the term for which the bonus is distributed.

DESPATCHES from Haverhill, Mass., dated the 9th inst., are to the effect that, in consideration of the affirming of its new franchise by the Municipal Council, the Haverhill Gas Company will refund a sum (equal to about $21,000) *pro rata* on all bills paid since July 1, 1909. Mr. Albert L. Bartlett has been appointed disburser of the rebates, and, having gone over the books, he will allow 10 cents on every $1 paid for gas between that time and now. This is in accordance with the provision in the new governing ordinance under which the $1 rate was to be made retroactive, up to the date mentioned, when the figure was $1.10.

THE four Directors named to serve on the Board of the Louisville Gas Company, to represent the public's interest in the capital thereof, are Messrs. John H. Whallen, F. A. Geher, W. J. Abram and Jas. B. Brown.

MR. HARVEY E. CLAY, formerly Manager of the Vincennes (Ind.) Light and Power Company, has been appointed General Manager of the Oskaloosa (Ia.) Gas Company. Mr. Clay has been with the Edward M. Deane & Co. syndicate, of Grand Rapids (in control of the Oskaloosa plant), in several important capacities.

THE Consumers Power Company has installed (and placed in operation) at Faribault, Minn, an ornamental curb lighting system, covering a stretch of 11 blocks in the business district, which is in agreement with the proposition made by the H. M. Byllesby Company, to the authorities, when the Byllesby folks were taking over the gas and electric properties in Faribault. This exhibition is of the electric sort, and numbers 106 standards, each upholding three 40-watt tungsten lamps. Three of the lamps are alight from dusk to midnight, and 1 lamp is kept in duty all night. Later on, perhaps, the Byllesby folks may show the authorities what may be done along ornamental lighting lines by means of gas arcs.

The "Independent" Street Lamp Lighter.

The "Independent" Street Lamp Lighter, which is being put on the market by the "Independent" Street Lighting Company, of Boston, is an automatic device for lighting and extinguishing street gas lamps, that is run by clockwork which requires winding only once in 11 days. A feature of the apparatus is that it is not affected by the weather or by vibration. The dial indicator can be set to turn the gas on or off at any time desired; but it cannot vary itself, wherefore the apparatus is accurate to a second.

The gas is ignited by a pilot light which is extinguished when the burner is lighted, and it is lighted again automatically when the burner is put out. Where self-lighting mantles are used the pilot can be eliminated. True one lighter would be required for each lamp post, but as each lamp could then be lighted at its proper time, rather than all at the same time, as by a pressure system or indiscriminately, as under present conditions. Its operation so far has been uniformly successful, and at any rate it is worth a fair trial.

The Market for Gas Securities.

Consolidated is 2 points up for the week (135¼ to 135½) at noon to-day (Friday), with a good ring to the sounds that are being made by the traders in bidding for it. The efforts of the surplus concealers are becoming rather strained, in fact we fear the job will shortly be altogether too much for them; and, try as they may, it will soon be beyond their strength. All the investment stock that could be shaken out has been garnered, and those who remained in the turmoil so far are bound to go on to the end. Just keep your eyes on Irving Place and in the vicinity of the old Custom House the next few weeks.

Brooklyn Union is 136½ to 137, and this concern too is likely to do some skyrocketing shortly. An official, high in the service of the Company, said yesterday to the writer, "I should not wonder if its surplus equalled its common stock!" Peoples, of Chicago, is steady, and Washington held its advance, plus a comfortable bit.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JULY 18.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	135¼	135½
Central Union Gas Co.— 1st 5's, due 1927, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	136½	137
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106½	107
Yonkers	299,550	509	130	—
Out-of Town Companies.				
Bay State	50,000,000	50	⅛	⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	509,000	1,000	90	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	103½	—
Mortgages, 6's	3,600,000		89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	99	99½
Preferred	2,500,000	100	90	100
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	80	81
Preferred	25,000,000	100	90	91
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106	106½
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104⅛	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.— 1st Mtg. 5's	751,000	1,000	100	102
Washington (D. C.) Gas Co.	1,600,000	200	380	390
1st Mortgage, 6's	600,000	—	—	—

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Information for New Business and Commercial and Municipal Ownership Campaigns. :: :: :: :: ::
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WANTED,

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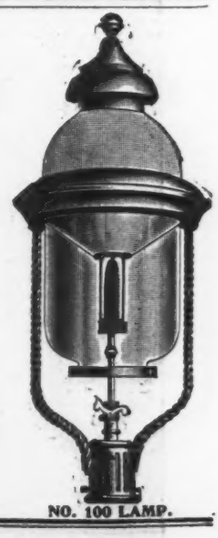

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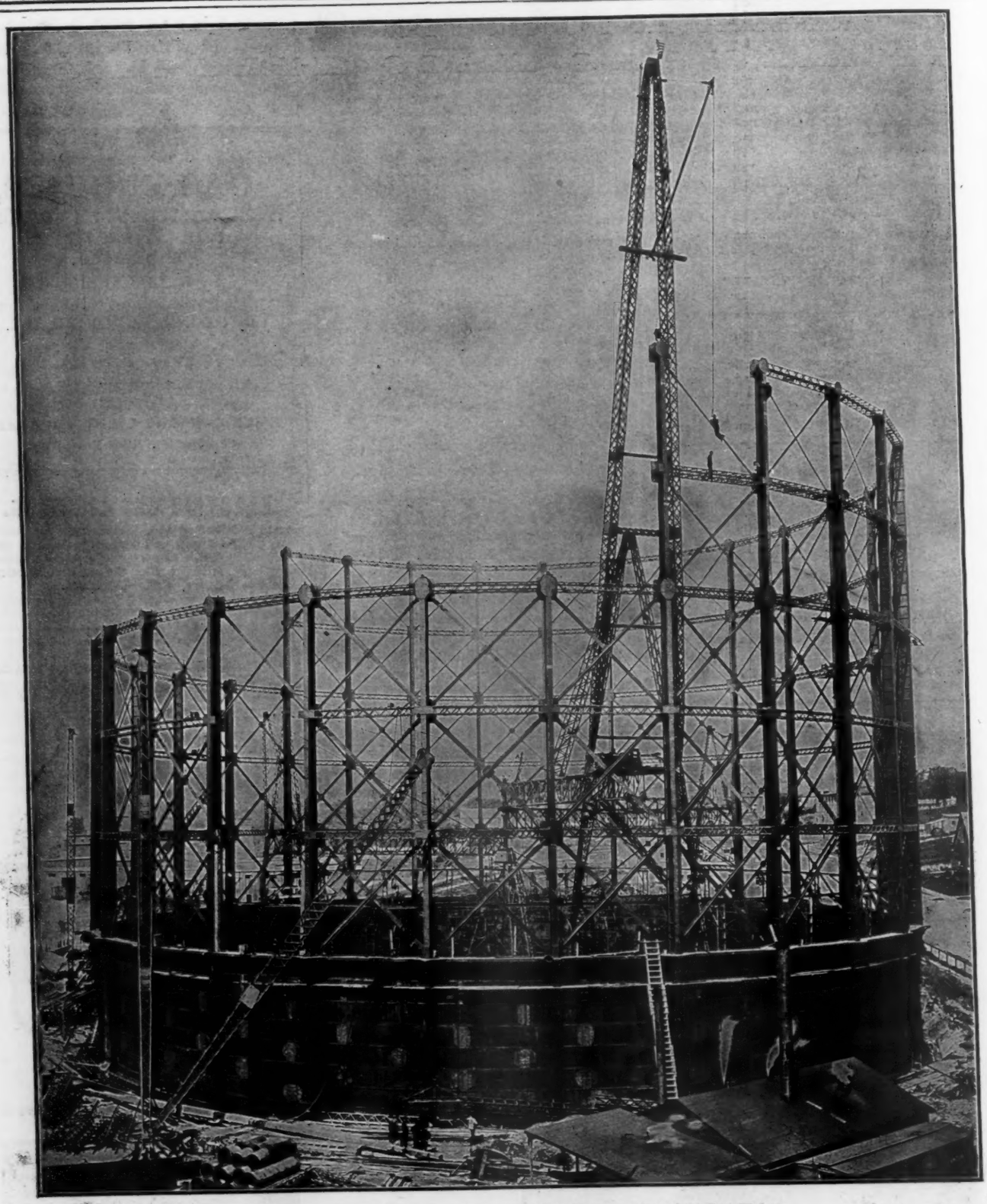

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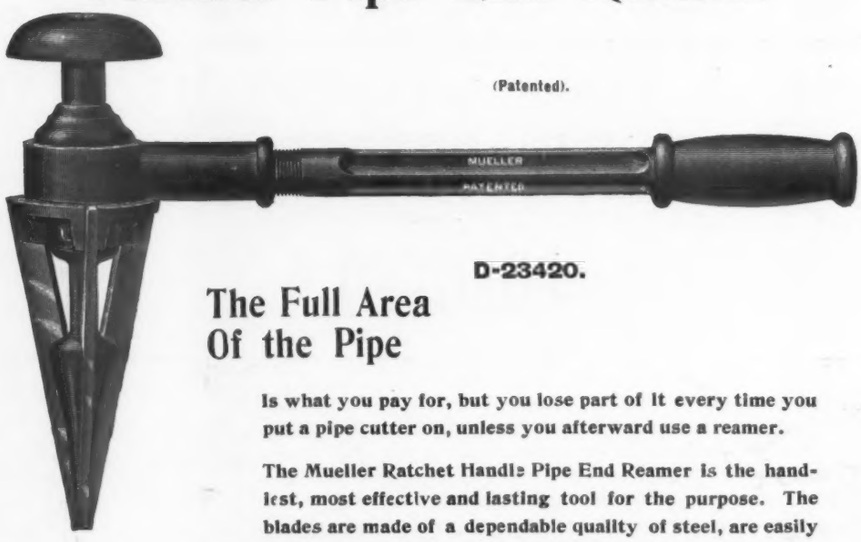

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MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, 1910. New York City. Officers: President, Wm. H. Bradley, N. Y., City Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ————————. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N, Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting, Baltimore, Md., Oct. 1911. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ————————. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, September, 1910; ———— Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 13, 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine; Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1911: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, 36 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O, Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers: President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, Feb. 16, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May, 1911, ———— Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, H. B. Head, Stephensville, Tex.

Wisconsin Gas Association.—Annual meeting, May ————, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

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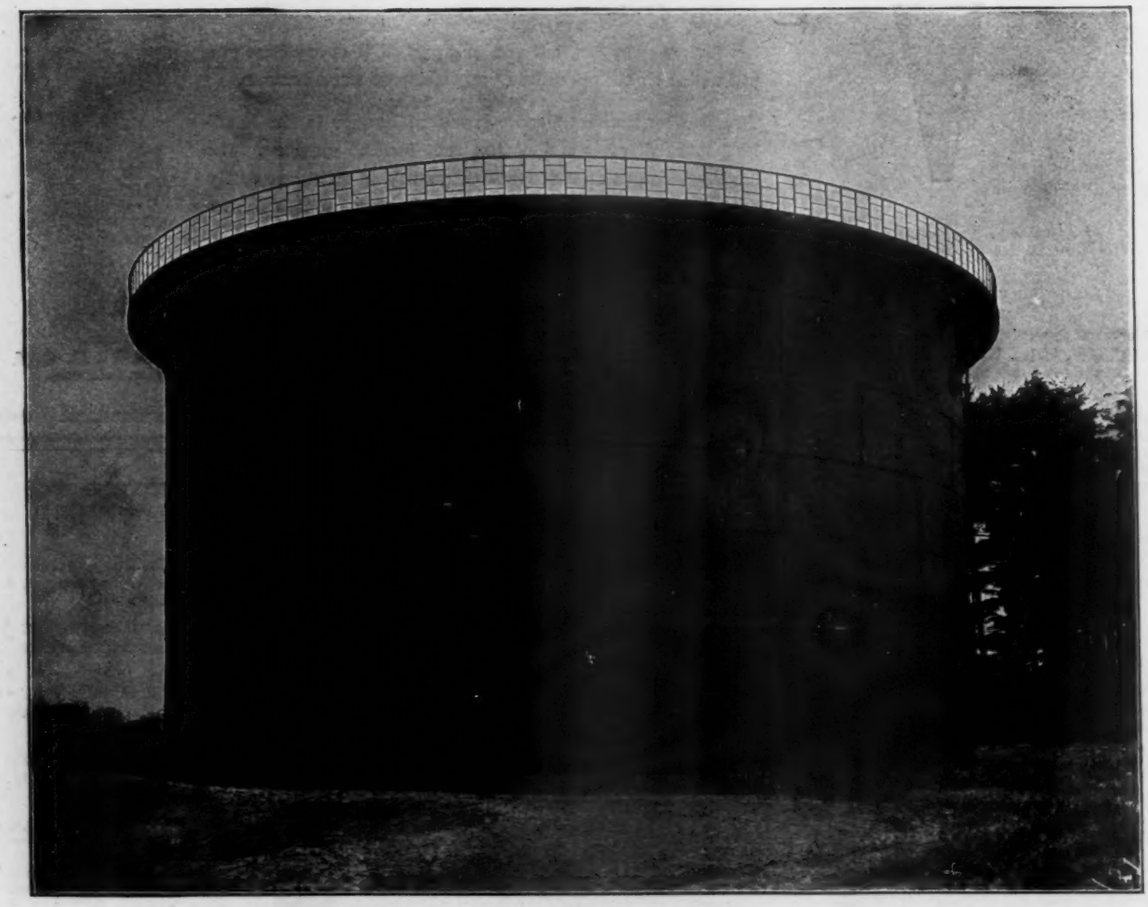

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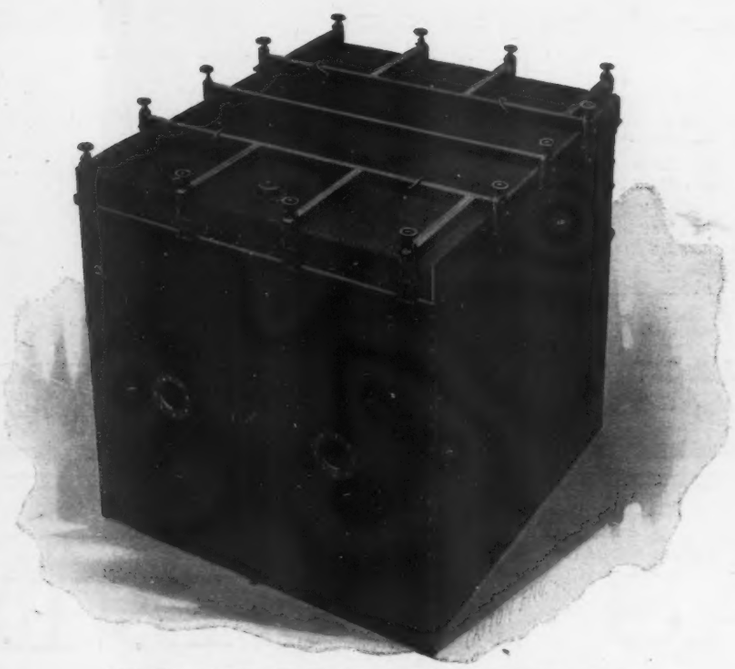

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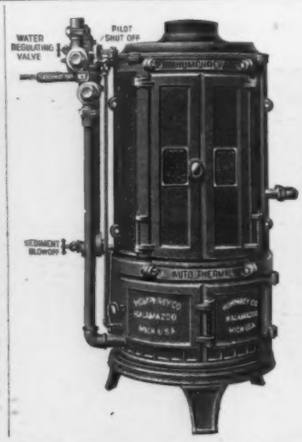

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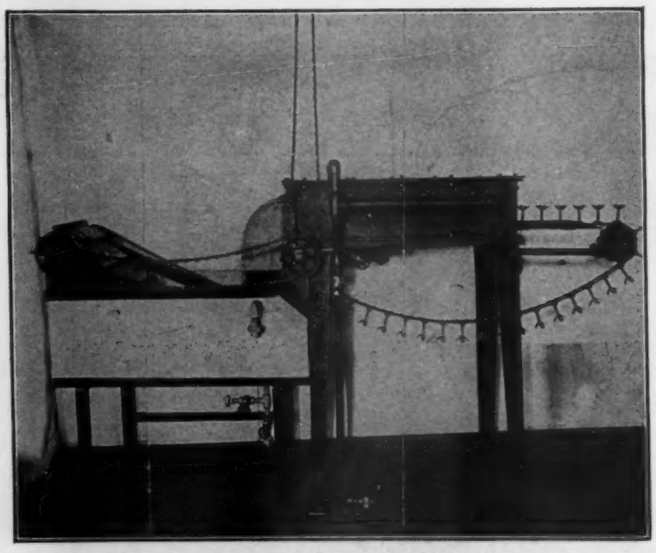

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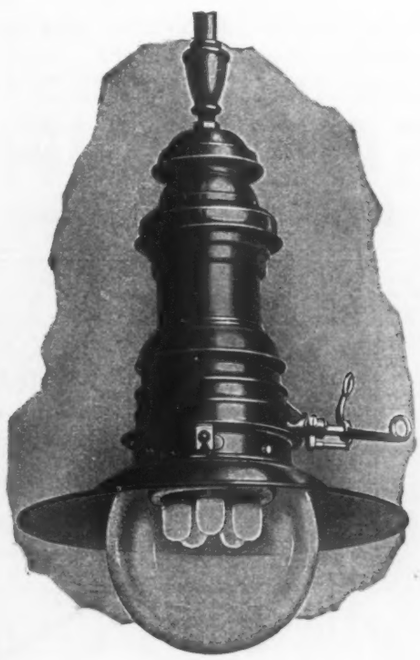

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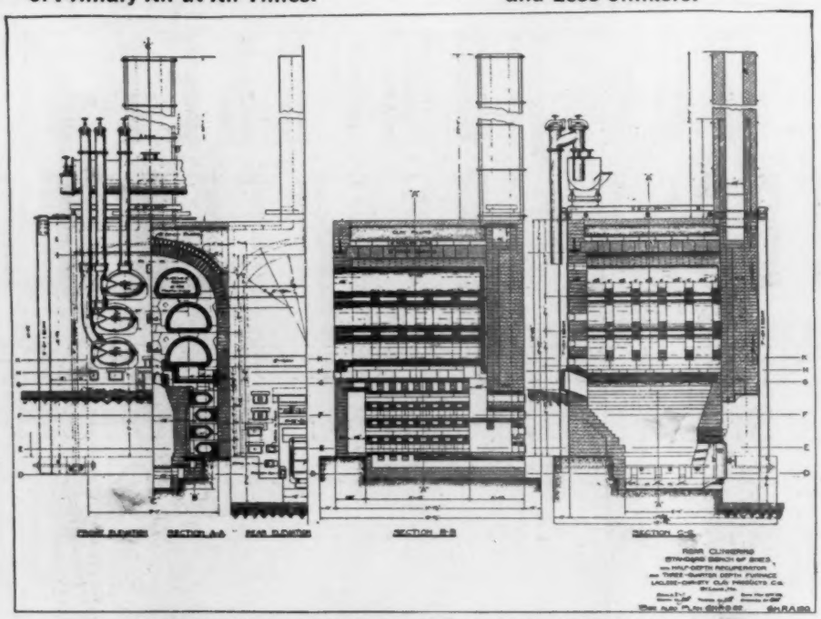

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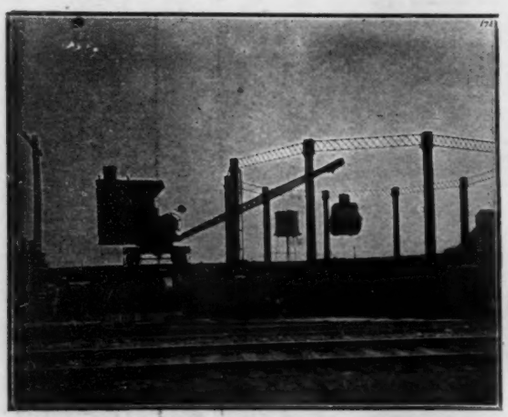

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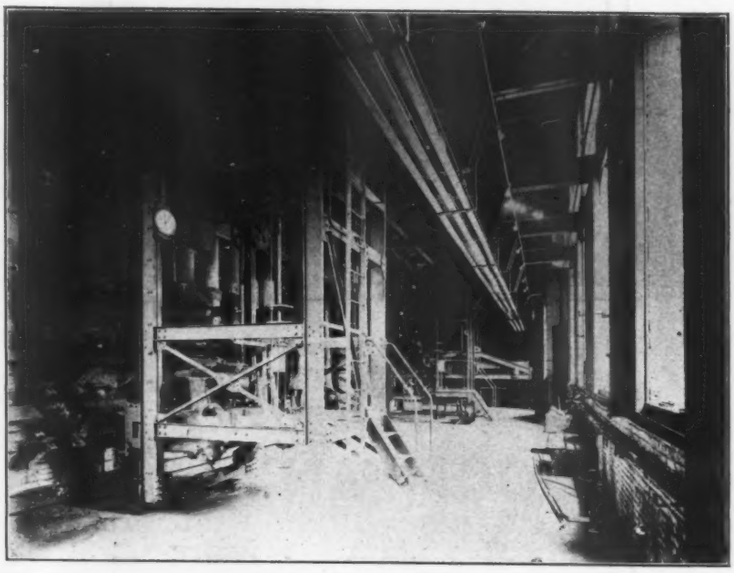

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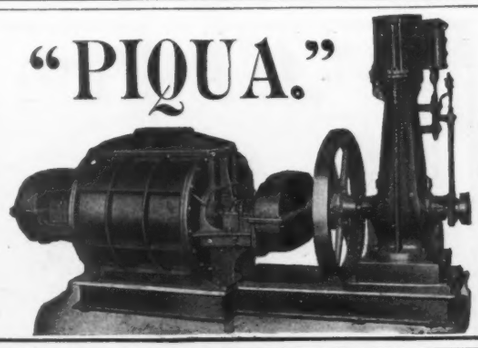

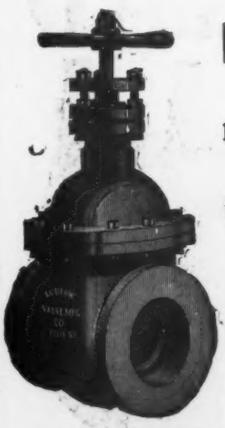

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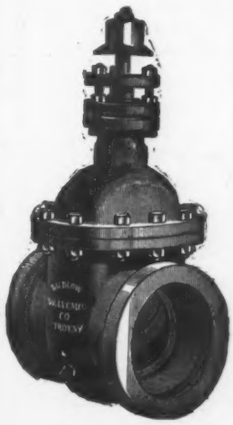

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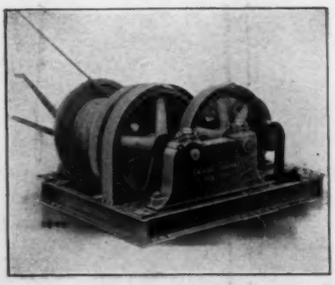

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		P.M.				P.M.	A.M.
Fri.	1	8.00	2.00 A.M.	Fri.	1	7.27	3.07
Sat.	2	8.00	2.30	Sat.	2	7.22	3.07
Sun.	3	8.00	3.40	Sun.	3	7.22	3.07
Mon.	4	8 00	3.40	Mon.	4	7.22	3.07
Tue.	5	8.00	3.40	Tue.	5	7.22	3 07
Wed.	6	8.00 N.M.	3.40	Wed.	6	7.22	3.07
Thu.	7	8.00	3.40	Thu.	7	7.22	3.07
Fri.	8	8.00	3.40	Fri.	8	7.23	3.07
Sat.	9	8.00	3.40	Sat.	9	7.17	3.12
Sun.	10	8.00	3.40	Sun.	10	7.17	3.12
Mon.	11	9.50	3.40	Mon.	11	7.17	3.12
Tue.	12	10.10	3.40	Tue.	12	7.17	3.12
Wed.	13	10.40 F.Q.	3.40	Wed.	13	7.17	3.12
Thu.	14	11.00	3.40	Thu.	14	7.17	3.12
Fri.	15	11.20	3.40	Fri.	15	7.17	3.12
Sat.	16	11.50	3.40	Sat.	16	7.12	3.17
		A.M.					
Sun.	17	12.20	3.50	Sun.	17	7.12	3.17
Mon.	18	1.00	3.50	Mon.	18	7.12	3.17
Tue.	19	1.40	3.50	Tue.	19	7.12	3.17
Wed.	20	No L.	No L.	Wed.	20	7.12	3.17
Thu.	21	No L. F.M.	No L.	Thu.	21	7.12	3.17
Fri.	22	No L.	No L.	Fri.	22	7.12	3.17
Sat.	23	7.50 P.M.	9.50 P.M.	Sat.	23	7.07	3.22
Sun.	24	7.50	10.20	Sun.	24	7.07	3.22
Mon.	25	7.50	10.40	Mon.	25	7.07	3.22
Tue.	26	7.50	11.10	Tue.	26	7.07	3.22
Wed.	27	7.50	11.40	Wed.	27	7.07	3.22
Thu.	28	7.50 L.Q.	12.00	Thu.	28	7.07	3.22
Fri.	29	7.50	12.30 A.M.	Fri.	29	7.07	3.22
Sat.	30	7.50	1.10	Sat.	30	7.02	3.27
Sun.	31	7.40	1.50	Sun.	31	7.02	3.27

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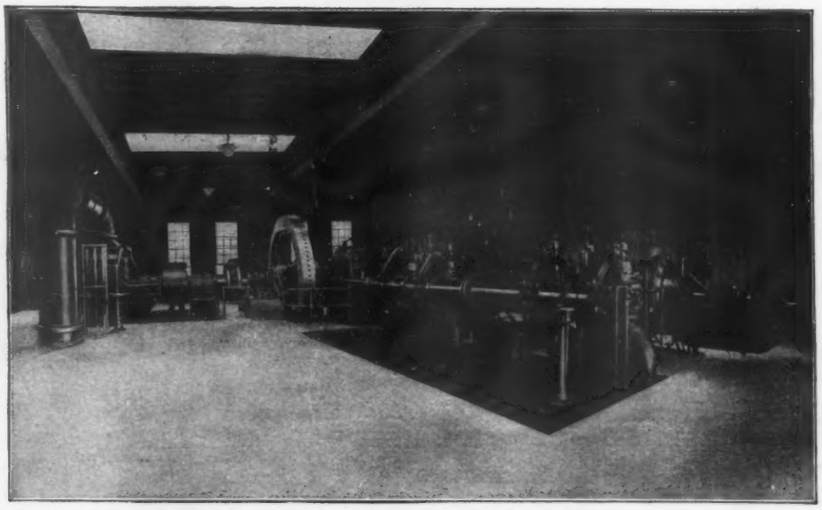

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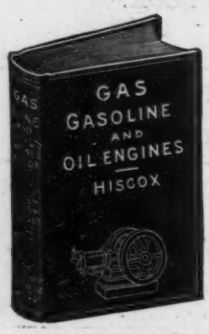

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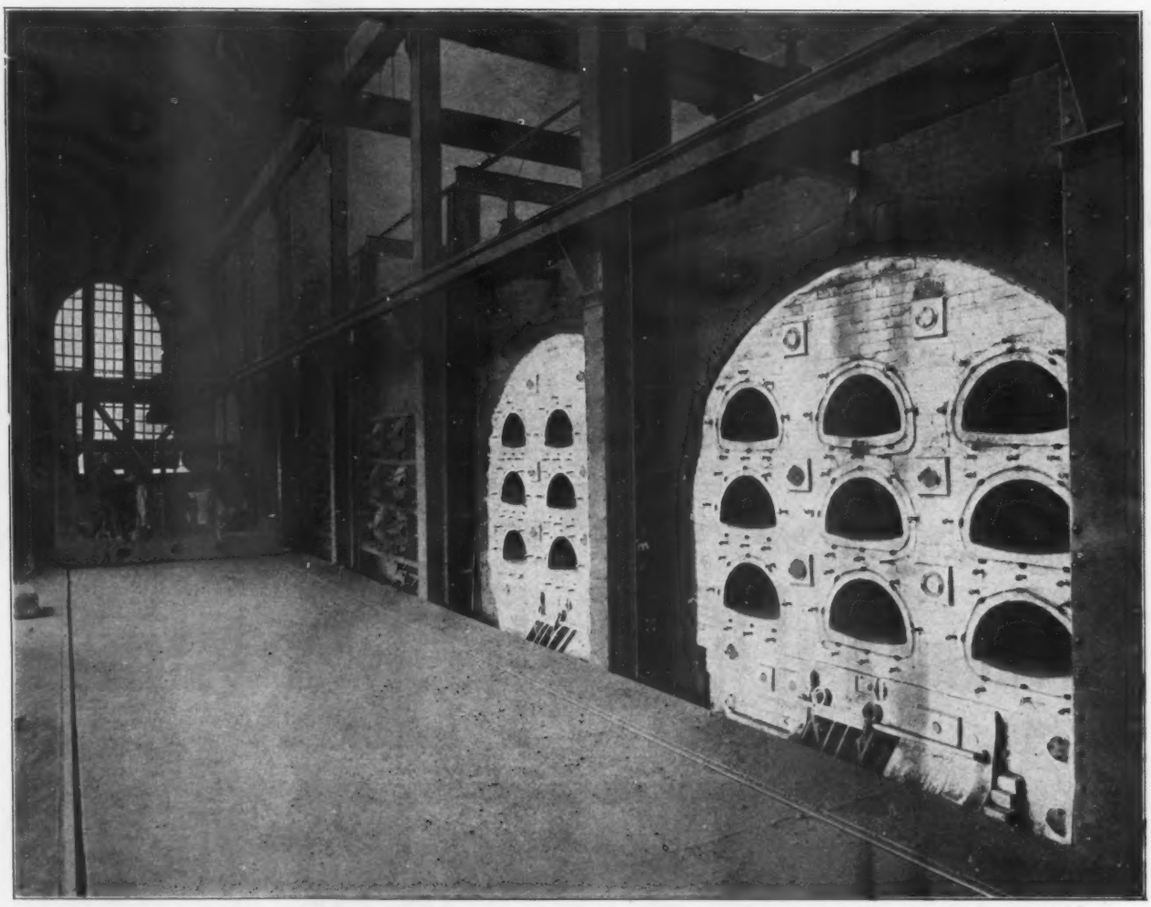

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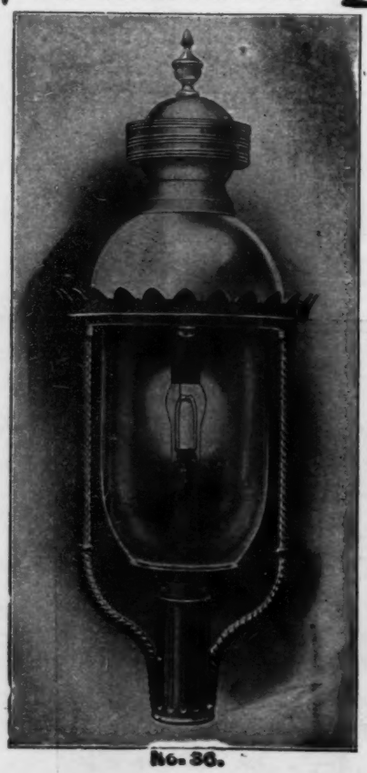

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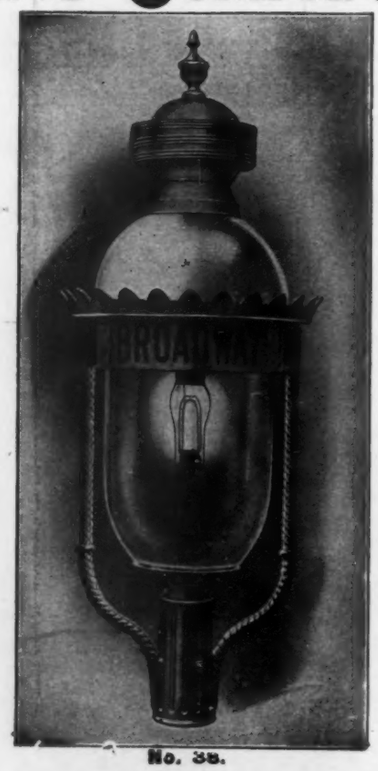

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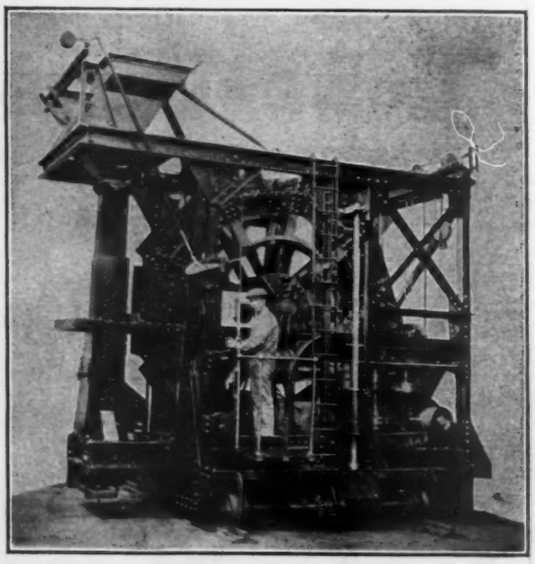

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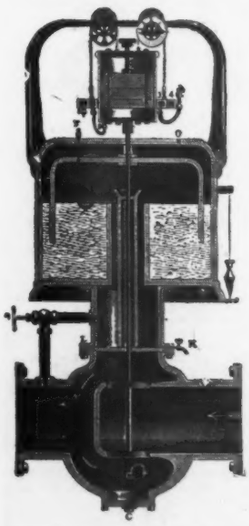

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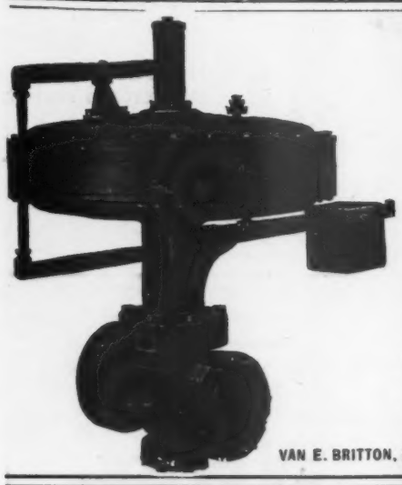

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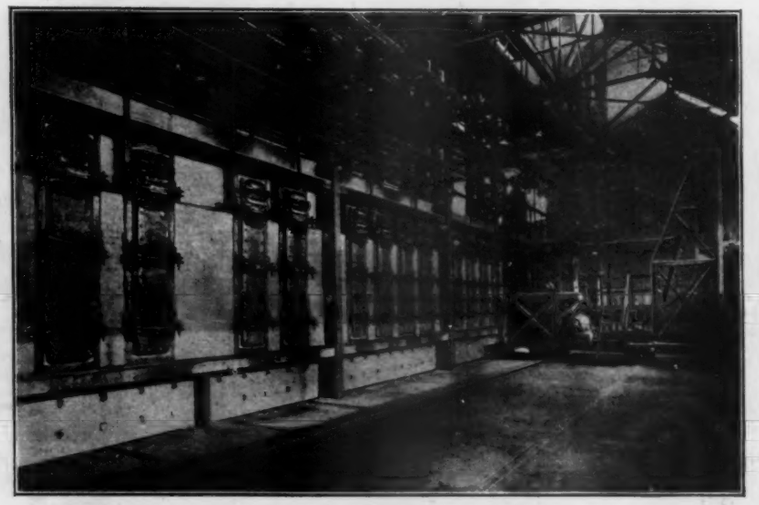

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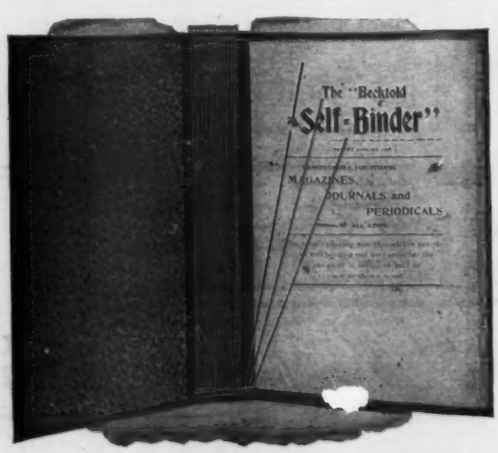

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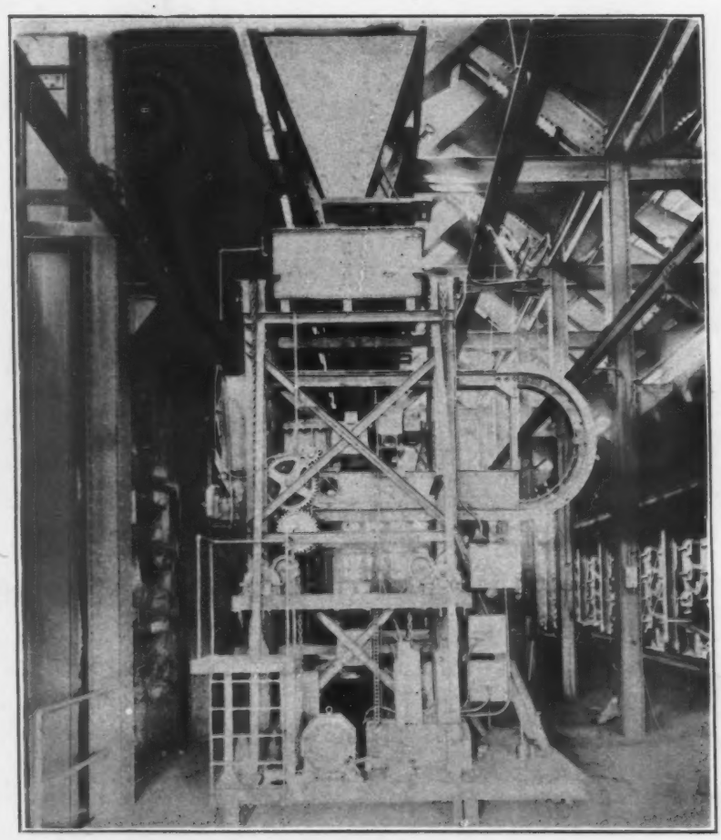

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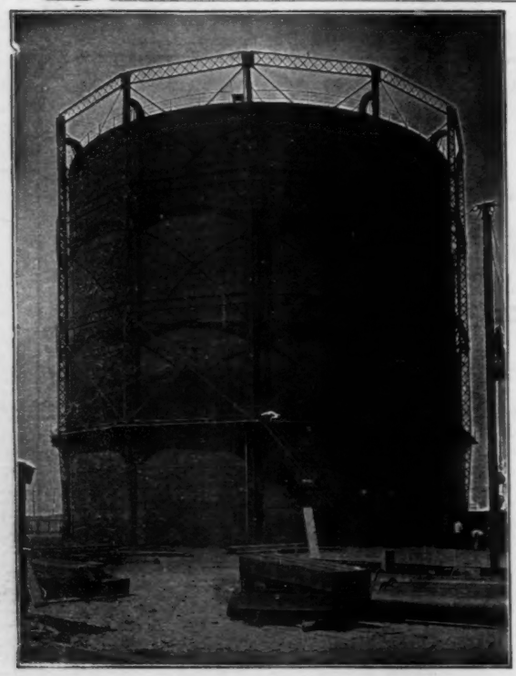

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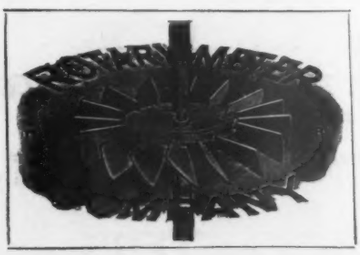

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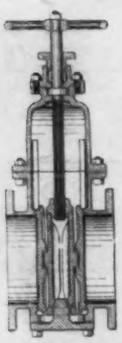

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